Thos Walsh Jr

MANUAL

OF

GYNECOLOGY

BY

HENRY T. BYFORD, M.D.

PROFESSOR OF GYNECOLOGY AND CLINICAL GYNECOLOGY IN THE COLLEGE OF PHYSICIANS AND SURGEONS OF CHICAGO; PROFESSOR OF CLINICAL GYNECOLOGY IN THE WOMAN'S MEDICAL SCHOOL OF NORTHWESTERN UNIVERSITY; PROFESSOR OF GYNECOLOGY IN THE POST-GRADUATE MEDICAL SCHOOL OF CHICAGO

SECOND EDITION

CONTAINING THREE HUNDRED AND FORTY-ONE ILLUSTRATIONS,
MANY OF WHICH ARE ORIGINAL

PHILADELPHIA
P. BLAKISTON, SON & CO.
1012 WALNUT STREET
1897

Entered according to Act of Congress, in the year 1897, by
P. BLAKISTON, SON & CO.,
In the Office of the Librarian of Congress, at Washington, D. C.

RG101
897By

Press of Wm. F. Fell & Co.,
1220-24 Sansom St.,
Philadelphia.

PREFACE TO THE SECOND EDITION.

In preparing the second edition, a large amount of new matter has been added, without materially increasing the bulk of the volume, and without departing from the scope and aims of the first edition.

The general arrangement has been retained, but has been simplified by devoting a separate "Part" each to carcinoma, sarcoma, and cystic tumors.

A new part, on the anatomy of the pelvic organs, has been inserted, as well as new chapters on venereal diseases. Angioma, hypertrophy, and atrophy of the uterus have received separate mention. The subjects of hyperplasia, chronic inflammation, and subinvolution of the uterus have been rewritten, and the chapters on urinary and fecal fistulæ and ectopic gestation have been almost entirely rewritten. The use of the cystoscope, ureteral instruments, and many other matters of minor detail have been incorporated.

New illustrations, taken largely from the author's cases, as well as many new selections, have been added.

A system of marginal notes has been devised to serve as a guide to the student. They are not intended as headings, but rather as pointers to the important things in each paragraph.

Thanks are due Prof. Evans, of the College of Physicians and Surgeons of Chicago, for preparing pathological specimens and superintending their reproduction.

PREFACE TO THE FIRST EDITION.

It has been the endeavor of the author of this book to supply the student with a Manual of Gynecology complete enough for study or reference in his college course, as well as a guide to him during his first years of practice. It is also intended as an adequate exposition of the subject to the older general practitioner who recognizes the impropriety of an attempt on his part to manage the more complicated cases or to perform the more difficult operations belonging to gynecology.

The subject has been simplified by the use of two kinds of type, viz. : a large type for essentials such as the student should master, and a small type for such amplification and addition of practical detail as may be of advantage for the practitioner, but which would burden the student's mind unnecessarily. The smaller type is appended to the paragraphs in such a way that it can be omitted or included in the course without creating confusion.

Minor operations such as may be safely performed by the general practitioner, as well as such of the more representative major operations as should be taught to the student, are described in the main text, while the unusual and complicated ones are described in small type by an enumeration of the steps and instruments or by an explanation of the things to be done. Thus the general practitioner will not attempt the latter without consulting a larger work.

The chapters in part one on gynecological technic and the principles of gynecological treatment are more minute in their details than is usual in such books, even to the description of many of the duties of nurses, for the purpose of enabling the student to understand, and the young practitioner to conduct, the preparation and aftertreatment of patients operated upon by professors or consultants.

The arrangement of the subject-matter has also the advantage of maintaining the student's interest better than that found in most text-books. When a course begins with a consideration of the external genitals, the student, after a time, becomes impatient for the more interesting subjects, while the latter part of the course, with its weariness of mind and preparations for examinations, becomes crowded with important matter that is apt to be slighted. If, on the other hand, the diseases of the external genitals are left until the end of the course, they are liable to be neglected both by the student and lecturer.

It is desirable to arrange a two-years' course by lecturing upon the first three or four parts to students of the third year, and upon the remainder to the fourth-year class. It is hoped that the numerous references will obviate any inconvenience that might at first result from the new arrangement. Combined with the numerous references, they have enabled the author to avoid many repetitions without taking away from the completeness of the exposition of the subjects, and thus, it is to be hoped, have given it some value as a book of reference for the practitioner without diminishing its value as a student's manual.

Valuable services in revision of the manuscript rendered by Dr. Marie L. White deserve grateful acknowledgment.

HENRY T. BYFORD, M. D.

Chicago, September 10, 1895.

TABLE OF CONTENTS.

PART ONE.

DIAGNOSIS AND TREATMENT.

CHAPTER I.

PAGE

DIAGNOSIS, ... 13

CHAPTER II.

GYNECOLOGICAL TECHNIC, ... 36

Aseptic and Antiseptic Detail. Preparation for Operations.

CHAPTER III.

GYNECOLOGICAL TECHNIC (*Continued*), ... 44

The Armamentarium.

CHAPTER IV.

GYNECOLOGICAL TECHNIC (*Continued*), ... 49

Operative Detail.

CHAPTER V.

THE PRINCIPLES OF GYNECOLOGICAL TREATMENT, ... 62

CHAPTER VI.

AFTERTREATMENT OF OPERATIONS, ... 71

PART TWO.

ANATOMY.

CHAPTER I.

THE VULVA AND VAGINA, ... 77

CHAPTER II.

THE PERINEUM AND PELVIC FLOOR, ... 82

CHAPTER III.

THE UTERUS, ... 86

CHAPTER IV.

PAGE

THE FALLOPIAN TUBES, ... 96

CHAPTER V.

ANATOMY OF THE OVARY, ... 99

CHAPTER VI.

THE URETHRA, BLADDER, AND URETERS, ... 102

CHAPTER VII.

THE RECTUM, ... 108

CHAPTER VIII.

THE PELVIC CONNECTIVE TISSUE AND PERITONEUM, ... 110

PART THREE.

DEVELOPMENT AND ANOMALIES OF DEVELOPMENT.

CHAPTER I.

DEVELOPMENT, ... 113

CHAPTER II.

ANOMALIES OF DEVELOPMENT, ... 119
The Ovaries and Fallopian Tubes.

CHAPTER III.

ANOMALIES OF DEVELOPMENT (*Continued*), ... 121
The Uterus.

CHAPTER IV.

ANOMALIES OF DEVELOPMENT (*Continued*), ... 132
The Vagina and Hymen.

CHAPTER V.

ANOMALIES OF DEVELOPMENT (*Continued*), ... 134
The Vulva.

CHAPTER VI.

ATRESIA AND STENOSIS OF THE GENITAL CANAL, ... 136
Gynatresia.

CHAPTER VII.

CHLOROSIS (GREEN SICKNESS), ... 146

PART FOUR.

FUNCTIONAL AND NERVOUS DISEASES.

CHAPTER I.

PAGE

Puberty, Menstruation, and the Menopause, ... 148

CHAPTER II.

Amenorrhea, ... 151

CHAPTER III.

Menorrhagia and Metrorrhagia, ... 155

CHAPTER IV.

Dysmenorrhea, ... 159

CHAPTER V.

Sterility, ... 167

CHAPTER VI.

Disorders of the Sexual Relation, ... 169
Anaphrodisia, Nymphomania, Perversion, Dispareunia.

CHAPTER VII.

Hyperesthesia and Vaginismus, ... 172

CHAPTER VIII.

Pruritus Vulvæ, ... 174

CHAPTER IX.

Hysteria and Hystero-epilepsy, ... 176

CHAPTER X.

Neurasthenia (Nervous Prostration), ... 180
The Rest Cure.

PART FIVE.

TRAUMATIC LESIONS OF THE GENITAL TRACT.

CHAPTER I.

Contusions and Hematoma of the Vulva, ... 186

CHAPTER II.

Laceration of the Perineum, ... 187

CHAPTER III.

PAGE

Urinary Fistula, ... 202

CHAPTER IV.

Ureteral Fistula, ... 209

CHAPTER V.

Fecal Fistula, ... 211

CHAPTER VI.

Laceration of the Cervix, ... 215

PART SIX.

DISPLACEMENTS.

CHAPTER I.

Displacements of the Uterus, ... 224

CHAPTER II.

Anteflexion of the Uterus, ... 228

CHAPTER III.

Anteversion of the Uterus, ... 234

CHAPTER IV.

Retroflexion and Retroversion of the Uterus, ... 236

Alexander's Operation, Vaginal Fixation of the Uterus, Hysterorrhaphy, Separation of Adhesions.

CHAPTER V.

Prolapse of the Uterus and Pelvic Organs, ... 253

Lapsus, Enterocele.

CHAPTER VI.

Inversion of the Uterus, ... 270

CHAPTER VII.

Displacements of the Ovary. Hernia of the Ovary, ... 276

PART SEVEN.

INFLAMMATION AND HYPERPLASIA.

CHAPTER I.

Inflammation of the Vulva, ... 280

Vulvitis, Labial Abscess.

CHAPTER II.

PAGE
INFLAMMATION OF THE VULVOVAGINAL GLAND, KRAUROSIS, NOMA, ELEPHANTIASIS, ... 282

CHAPTER III.

VAGINITIS, ... 288

CHAPTER IV.

URETHRITIS, ... 292

CHAPTER V.

CYSTITIS, ... 298

CHAPTER VI.

ACUTE ENDOMETRITIS. ACUTE METRITIS, ... 303

CHAPTER VII.

CHRONIC CERVICAL METRITIS AND HYPERPLASIA, ... 308

CHAPTER VIII.

HYPERPLASIA OF THE UTERUS AND HYPERPLASTIC SUBINVOLUTION, . 319
Glandular Endometritis, Hyperplasia Mucosæ Uteri, Hyperplasia Interstitialis, Simple Endometritis, Menstrual Subinvolution.

CHAPTER IX.

CHRONIC METRITIS, ... 331
Chronic Interstitial Endometritis, Chronic Parenchymatous Metritis, Inflammatory Subinvolution, Chronic Septic Metritis.

CHAPTER X.

SALPINGITIS AND ITS COMPLICATIONS, ... 344
Pelvic Peritonitis. Abscess of the Ovary.

CHAPTER XI.

SALPINGITIS AND ITS COMPLICATIONS (*Continued*), ... 362
Oophorectomy, Vaginal and Abdominal Hysterectomy for Diseased Appendages.

CHAPTER XII.

PELVIC CELLULITIS, ... 372
Parametritis, Parasalpingitis, Paraproctitis, Paracystitis, Adenolymphitis, Phlegmon of the Broad Ligament, Pelvic Abscess.

CHAPTER XIII.

HYPEREMIA AND HEMATOMA OF THE OVARY, ... 382

CHAPTER XIV.

OOPHORITIS. INFLAMMATION OF THE OVARY, ... 385
Gyroma, Endothelioma.

CHAPTER XV.

PAGE
Gonorrheal Inflammation, ... 391

CHAPTER XVI.

Syphilis and Chancroid, ... 412

PART EIGHT.

GENITAL TUBERCULOSIS.

CHAPTER I.

Tuberculosis of the Vulva and Vagina, ... 418

CHAPTER II.

Tuberculosis of the Cervix Uteri, ... 420

CHAPTER III.

Tuberculosis of the Corpus Uteri, ... 423

CHAPTER IV.

Tuberculosis of the Fallopian Tube and Ovary, ... 426

CHAPTER V.

Tuberculosis of the Peritoneum, ... 431

CHAPTER VI.

Tuberculosis of the Female Bladder, ... 439

PART NINE.

CARCINOMA.

CHAPTER I.

Carcinoma of the Vulva, ... 443

CHAPTER II.

Carcinoma of the Vagina, ... 445

CHAPTER III.

Carcinoma of the Cervix Uteri, ... 447
High Amputation of the Cervix. Vaginal Hysterectomy.

CHAPTER IV.

Carcinoma of the Corpus Uteri, ... 470

CHAPTER V.

PAGE
CARCINOMA OF THE FALLOPIAN TUBE, ... 479

CHAPTER VI.

CARCINOMA OF THE OVARY, ... 482

PART TEN.

SARCOMA.

CHAPTER I.

SARCOMA OF THE VULVA AND VAGINA, ... 485

CHAPTER II.

SARCOMA OF THE UTERUS, ... 487

CHAPTER III.

SARCOMA OF THE FALLOPIAN TUBES AND OVARIES, ... 494

CHAPTER IV.

ENDOTHELIOMA, ... 495

PART ELEVEN.

MYOMA, FIBROMA, FIBROMYOMA.

CHAPTER I.

MYOMA OR FIBROMYOMA OF THE VULVA AND VAGINA. 501

CHAPTER II.

MYOMA OR FIBROMYOMA OF THE UTERUS, ... 502
Abdominal Hysterectomy.

CHAPTER III.

MYOMA OF THE FALLOPIAN TUBE, FIBROMA OF THE OVARY, ... 523

CHAPTER IV.

MYOMA OF THE ROUND LIGAMENT, OVARIAN LIGAMENT, AND BROAD LIGAMENT, ... 524

PART TWELVE.

CYSTIC TUMORS.

CHAPTER I.

PAGE
Cystic Tumors of the Vulva, Vagina, and Uterus, ... 526

CHAPTER II.

Cystic Tumors of the Ovary, ... 529

CHAPTER III.

Cysts of the Broad Ligament, ... 552
Parovarian Cysts.

PART THIRTEEN.

LIPOMA, PAPILLOMA, AND VASCULAR GROWTHS AND TUMORS.

CHAPTER I.

Lipoma, ... 556

CHAPTER II.

Papilloma, ... 557

CHAPTER III.

Varicose Veins, Vascular Tumors, Urethral Caruncle, Angioma of the Uterus, ... 559

PART FOURTEEN.

EXTRA-UTERINE PREGNANCY, PELVIC HEMATOCELE, AND PELVIC HEMATOMA.

CHAPTER I.

Extra-uterine Pregnancy, ... 563
Ectopic Gestation. Tubal Pregnancy.

CHAPTER II.

Pelvic Hematocele and Pelvic Hematoma, ... 584

LIST OF ILLUSTRATIONS.

FIG. PAGE
1. Gynecological Chair, ... 17
2. Gynecological Table for Examination, ... 17
3. Gynecological Postures (*Potter*), ... 19
4. The Bimanual Examination in the Dorsal Posture (*Schroeder*), ... 24
5. Simpson's Sound, ... 25
6. Sims' Silver Probe, ... 25
7. Budd's Hard-rubber Probe, ... 25
8. Sims' Speculum, ... 26
9. Sims' Depressor, ... 26
10. Dudley's Uterine Tenaculum, ... 27
11. Exposure of Cervix with Sims' Speculum (*After Photograph by Author*), 27
12. Higbee's Speculum, ... 28
13. Goodell's Speculum, ... 28
14. Bivalve Speculum Introduced (*After Drawing by Author*), ... 28
15. Jackson's Perineal Retractor, ... 29
16. Lateral Vaginal Retractor, ... 29
17. Vulsellum Forceps, ... 30
18. Uterine Dressing Forceps, ... 30
19. Uterine Applicator, ... 30
20. Braun's Uterine Syringe, ... 30
21. Block-tin Uterine Dilator. The Author's Model, ... 31
22. Wathen's Uterine Dilator, ... 32
23. Urethral Dilator. The Author's Model, ... 32
24. Trocar-pointed Cervical Scarificator. The Author's Model, ... 33
25. Medium Sharp Uterine Curette. The Author's Model, ... 33
26. Sims' Sharp Uterine Curette. The Author's Model, ... 33
27. Kelly's Cystoscope, ... 34
28. Kelly's Urethral Calibrator, ... 34
29. Kelly's Evacuator, ... 34
30. The Author's Modification of Kelly's Bladder Forceps, ... 34
31. Kelly's Ureteral Searcher, ... 34
32. Kelly's Ureteral Catheter, ... 34
33. Whalebone Ureteral Guide. The Author's Model, ... 35
34. Spiral Ureteral Sound. The Author's Model, ... 35
35. Boeckmann's Combined Sterilizer, Closed, ... 38
36. Same, Uncovered, Showing Instrument-tray Below, ... 38
37. Boeckmann's Hospital Sterilizer, ... 39
38. Glass Drainage-tube for Use in Abdominal Section, ... 41
39. Arrangement of Tables and Assistants for Abdominal Section (*Byford*), 47
40. Frame for Trendelenburg's Posture, ... 48
41. Trendelenburg's Posture on Edebohl's Table, ... 48
42. Syringe with Rubber Tube Attached for Emptying Drainage-tube, . . 50
43. Ureteral Catheter Passed into Left Ureter, Showing Position of Patient and Direction of Cystoscope and Catheter (*Byford*), ... 53

FIG. PAGE
44. Emmet's Trocar for Tapping the Abdomen, ... 54
45. The Author's Probe-pointed Fascia Scissors, ... 55
46. The Author's Long-handled Needle Forceps, ... 57
47. Slippery-elm Tent, Whittled from Fresh Bark (⅔ size), ... 60
48. The Vulva (*Byford*), ... 77
49. Glands of the Vestibule (*Savage*), ... 79
50. Vulvovaginal Gland (*Huguier*), ... 79
51. Horizontal Section of the Pelvic Floor Near Pelvic Outlet, Showing Vaginal and Rectal Slits (*Henle*), ... 81
52. Anterior Wall of Vagina, Showing Columnæ Rugarum (*Savage*), . . . 81
53. Dissection of the Muscles of the Perineum and Pelvic Floor (*Savage*), 83
54. Perineal Triangle of Virgin, Life Size (*Byford*), ... 84
55. Levator Ani and Coccygeus Muscles (*Savage*), ... 84
56. Relations of Muscles and Fasciæ to the Perineal Triangle (*Byford*), . 85
57. Virgin Uterus (*Sappey*), ... 86
58. Virgin Uterus, Median Section (*Sappey*), ... 86
59. Median Section of Pelvis (*After "American Text-book of Obstetrics"*), 87
60. Transverse Section of Virgin Uterus. Palmæ Plicatæ of the Cervix. Triangular Shape of the Uterine Cavity (*Sappey*), ... 89
61. One of the Palmæ Plicatæ Enlarged (*Courty*), ... 90
62. Cervical Gland from the Uterus of a Multipara (*Boldt*), ... 90
63. Fetal Uterus and Adnexa in Ninth Month. Posterior View (Dr. Mergler's Case) (*Byford*), ... 90
64. Infantile Uterus and Adnexa, from Child Eighteen Months Old. Posterior View (Dr. Patrick's Case) (*Byford*), ... 91
65. Infantile Uterus. Coronal Section (*Schroeder*), ... 91
66. View of Pelvic Organs. Seen from Above (*Savage*), ... 92
67. Vertical Section through the Mucous Membrane of the Uterus (*Ruge*), 93
68. Scheme of the Ovarian, Uterine, and Vaginal Arteries (*From "Morris' Anatomy"*), ... 94
69. Lymphatics of the Uterus (*Poirier*), ... 95
70. Fallopian Tube and Ovary, Seen from Behind (*Modified from Henle*), . 96
71. Normal Fallopian Tube (*Wyder*), ... 97
72. Normal Ovary and Parovarium (*Martin's Atlas*), ... 99
73. Section of Ovary Showing Peripheral Ripened Follicles (*Sutton*), . . 100
74. Two Graafian Follicles (*Davis*), ... 100
75. Human Ovum, ... 101
76. Urethra Laid Open with Probes, Distending Skene's Glands. Posterior Wall Divided (*Skene*), ... 102
77. Epithelium of the Bladder (*Obersteiner*), ... 104
78. Base of Bladder, Showing Entrance of Ureters (*Savage*), ... 105
79. Dissection of the Left Side of the Pelvic Cavity, Showing Course of Left Ureter. Small Venous Radicals not Shown (*Nagel*), ... 106
80. Inflated Rectum (*Chadwick*), ... 109
81. Horizontal Section of One-half of the Pelvis through the Second Sacral Vertebra, Showing Pelvic Connective Tissue (*W. A. Freund*), . . 111
82. Diagrammatic Cross-section of a Vertebrate, Showing the Fundamental Relations of the Urogenital System (*Minot*), ... 114
83. Diagram of the Indifferent Stage of the Urogenital System (*Minot*), . 114
84. Diagram of Development of Female Sexual Apparatus (*Minot*), . . . 115
85. Tortuous Course of a Fetal Fallopian Tube, ... 116
86. Müller's Ducts, ... 116
87. Coalescence of Ducts, ... 116
88. Disappearance of Septum, ... 116

FIG. PAGE
89. Appearance of Fundus and Cervix, ... 116
90. Scheme of Development of Female Genital Organs (*Schroeder*), . . . 117
91. Cloaca Formed with Descent of the Tissue between the Rectum and the Allantois (*Schroeder*), ... 117
92. Formation of the Urogenital Sinus (*Schroeder*), ... 117
93. Formation of Perineum and Urethra (*Schroeder*), ... 118
94. Fully-formed Genitals (*Schroeder*), ... 118
95. Fallopian Tube with Five Accessory Ostia, or Supplementary Tubes (*R. Kossmann*), ... 120
96. Rudimentary Uterus, Lying Flat on the Posterior Wall of the Bladder (*Langenbeck*), ... 122
97. Membranous Uterus (*Winckel*), ... 122
98. Uterus Unicornis with Rudimentary Horn (*Schroeder*), ... 123
99. Uterus Bicornis (*Schroeder*), ... 123
100. Two-horned Uterus with Single Cervix (*Winckel*), ... 123
101. Two-horned Uterus with Double Cervix (*Schauta*), ... 124
102. Uterus with Flat Fundus (*Oldham*), ... 124
103. Double Uterus (*Ollivier*), ... 125
104. Two-chambered Uterus (*Kussmaul*), ... 125
105. Fetal Uterus and Vagina, Showing Papillary Folds of Vagina (*W. Nagel*), ... 126
106. Fetal Uterus and Vagina (*Winckel*), ... 127
107. Infantile Uterus (*Winckel*), ... 127
108. Various Forms of Hymen (*Lewers*), ... 133
109. Atresia of External Os Uteri (*Schultze*), ... 140
110. Stenosis of External Os Uteri (*Winckel*), ... 142
111. A Dysmenorrheal Membrane Laid Open (*Coste*), ... 166
112. Sims' Glass Vaginal Dilator, ... 174
113. Normal Shape of Perineal Body in Median Section. External Lacerations (*Byford*), ... 188
114. Lateral Perineal Lacerations (*Byford*), ... 188
115. Uncicatrized Transverse Perineal Lacerations (*Byford*), ... 188
116. Denudation for Bilateral Perineorrhaphy, with Sutures Passed (*From Emmet*), ... 193
117. Same, with Vaginal Sutures Tied, ... 193
118. Emmet's Angular Scissors, ... 195
119. Line of Cleavage in Tait's Perineorrhaphy, for Partial Laceration (Schematic) (*Byford*), ... 196
120. Flap Raised (*Byford*), ... 196
121. Moderate Partial Laceration of Perineum Before Operation (*Author's Case, from Photograph*), ... 197
122. Tait's Perineorrhaphy. Flap Raised and Sutures Passed (*Same Case*), 198
123. Operation Completed (*Same Case*), ... 199
124. Lines of Cleavage in Tait's Perineorrhaphy for Complete Laceration (Schematic) (*Byford*), ... 200
125. Same, with Flap Drawn Up, ... 200
126. Hegar's Denudation for Complete Laceration, ... 201
127. Freund's Bilateral Denudation, ... 201
128. Emmet's Broad Vaginal Denudation, ... 201
129. Method of Paring the Edges of Vesicovaginal Fistulæ, ... 205
130. Method of Passing the Needle, ... 205
131. Sutures Passed, ... 206
132. Goodman–Skene Self-retaining Catheter, ... 206
133. Malécot's Soft-rubber Self-retaining Catheter, ... 206

FIG. PAGE
134. Fistula Extending Along the Edge of the Cervix (Schematic) (*Byford*), ... 207
135. Same, with Sutures Passed, ... 207
136. Same, with Sutures Tied, ... 207
137. Fistula Extending to Edge of Cervix (Schematic) (*Byford*), ... 208
134. Same, with Wedge Cut from Cervix and Sutures Passed, ... 208
139. Same, with Sutures Tied, ... 208
140. Pozzi's Operation for Ureteral Fistula, ... 211
141. Unilateral Laceration of the Cervix (*After Mundé and Thomas*), . . 215
142. Bilateral Laceration of the Cervix with Eversion (*After Mundé and Thomas*), ... 216
143. Multiple Stellate Laceration of Cervix (*After Mundé and Thomas*), . 216
144. Bilateral Laceration of the Cervix with Eversion. Side View (Schematic) (*Byford*), ... 217
145. Lacerated Cervix after Denudation (*After Skene*), ... 220
146. Same as Fig. 145, with Sutures Passed, ... 220
147. Same, with Sutures Tied, ... 220
148. Line of Incision in Excision of the Cervical Mucous Membrane. Side View (*Schroeder*), ... 222
149. Same as Fig. 148, with the Tissue Removed and Flap Drawn up by the Sutures, ... 222
150. Normal Position of the Female Pelvic Organs in the Virgin (*Byford*), 224
151. Anteversion and Retroversion (*B. S. Schultze*), ... 226
152. Anteflexion and Retroflexion (*B. S. Schultze*), ... 227
153. Uterine Suspensory Ligaments on a Level with the Internal Os Uteri (Schematic) (*Byford*), ... 229
154. Pathological Anteflexion, Caused by Short Sacro-uterine Ligaments (*B. S. Schultze*), ... 229
155. Normal Insertion of Cervix into Vagina in Adult (Natural Size), . . 230
156. Approximation to the Condition of Childhood, often Met with in Virgins (*B. S. Schultze*), ... 230
157. Normal Form of Cervix and Insertion into Vagina in Childhood (*B. S. Schultze*), ... 230
158. Puerile Anteflexion (*B. S. Schultze*), ... 231
159. Anteflexion with Retroversion and Retroposition (*Byford*), ... 231
160. Bimanual Rectovaginal Examination of the Uterus (*Byford*), . . . 232
161. Anteversion, Due to Chronic Metritis and Parametritis Posterior (*B. S. Schultze*), ... 235
162. Retroversion Due to Anterior Fixation of the Cervix (*B. S. Schultze*), 236
163. Extreme Retroflexion of the Cervix Due to Inflammatory Contraction on the Posterior Surface of the Uterus (*Byford*), ... 236
164. Congenital Retroversion (*B. S. Schultze*), ... 237
165. Retroflexion with Adhesions (*a* and *b*) Between the Uterus and Rectum (*Winckel*), ... 238
166. Bimanual Palpation of the Uterus from the Posterior Vaginal Wall (*Byford*), ... 240
167. Intramural Myoma of Posterior Uterine Wall Simulating Retroflexion (*From Photograph of Author's Specimen*), ... 241
168. Bimanual Reposition of Retroflexed Uterus (*B. S. Schultze*), . . . 243
169. Bimanual Reposition of the Retroflexed Uterus: External Hand Taking Charge of the Fundus (*B. S. Schultze*), ... 245
170. Bimanual Reposition of the Retroflexed Uterus Completed (*B. S. Schultze*), ... 245
171. Albert Smith Pessary, ... 247

FIG. PAGE
172. Thomas' Retroflexion Pessary, ... 247
173. Schultze's Figure-of-eight Pessary, ... 247
174. Introduction of Pessary over the Sound (*Byford*), ... 248
175. Pushing Posterior Arm of Pessary Behind the Cervix (*Byford*), . . 248
176. Oval Denudations in Lateral Vaginal Fornices for Drawing Cervix Backward (Schematic) (*Byford*), ... 252
177. Same as Fig. 176. Sutures Tied, ... 252
178. Cystocele (*Photograph of Author's Case*). 255
179. Complete Procidentia Uteri, with Retroflexion (*Schroeder*), ... 255
180. Same Malposition as Fig. 179, Showing also Ulceration of the Vagina, ... 256
181. Division of the Cervix into the Vaginal, Intermediate, and Supra-Vaginal Portion (*Schroeder*), ... 256
182. Protrusion of the Cervix with Elongation of the Vaginal Portion (*After Graily Hewitt*), ... 257
183. Protrusion of the Cervix with Elongation of the Intermediate Portion (*After Graily Hewitt*), ... 257
184. Inflatable Rubber Ring, ... 261
185. Inflatable Rubber Bag, ... 261
186. Elastic Ring Pessary, ... 261
187. Schultze's Sleigh Pessary, ... 261
188. Combined Action of the Hands of the Operator and Assistant in Elevating the Uterus (*After Thuré Brandt*), ... 263
189. Position of the Hands over the Pubes, *b* of Fig. 188 (*After Thuré Brandt*), ... 263
190. Stoltz's Denudation for Urethrocele and Anterior Colpocele (*Mundé*), 264
191. Lateral Denudations in the Anterior Vaginal Sulci for Cystocele (*Byford*), ... 265
192. Same as Fig. 191, Joined by Transverse Denudation, ... 265
193. Median Section of Cervix, Showing Methods of Amputation, ... 267
194. Position of Rubber Bag in the Reduction of Inversion (*Byford*), . . 275
195. Distention of the Right Vulvovaginal Gland with Pus (*From Photograph of Author's Case*), ... 283
196. Elephantiasis Nympharum (*Winckel*), ... 287
197. Microscopic Section of Preceding Figure (*Winckel*), ... 287
198. Papillary Erosion (*Schroeder*), ... 309
199. Follicular Erosion (*Schroeder*), ... 310
200. Mucous Polypi Growing in the Cervix Uteri (*Overlach*), ... 310
201. Microscopic Section of a Mucous Polypus (*De Sinéty*), ... 311
202. Microscopic Section from Base of a Polypus Demonstrating its Origin to be from the Mucous Membrane. × 110. (*Prepared by Evans from Author's Case*), ... 312
203. Vertical Section of Normal Mucous Membrane (*Van Tussenbroek and Mendes de Leon*), ... 319
204. Hyperplasia of Uterus with Glandular Hypertrophy (*Van Tussenbroek and Mendes de Leon*), ... 320
205. Hyperplasia of Uterus with Glandular Hypertrophy (*Zweifel*), . . . 321
206. Transverse Incision through a Gland with more than one Layer of Epithelium (*Van Tussenbroek and Mendes de Leon*), ... 321
207. Hyperplasia of Uterus with Hyperplasia or Multiplication of the Glands, ... 322
208. Hyperplasia with Adenomatous Character. × 110. (*Evans' Preparation from Author's Case*), ... 323

FIG. PAGE
209. Commencing Atrophy of the Mucous Membrane (*Van Tussenbroek and Mendes de Leon*), ... 324
210. Horizontal Section of Endometrium in Chronic Metritis (*Van Tussenbroek and Mendes de Leon*), ... 331
211. Acute and Chronic Metritis (*Zweifel*), ... 332
212. Later Stage of Chronic Metritis (*Zweifel*), ... 332
213. Uterine Mucous Membrane in First Stage of Metritis (*Van Tussenbroek and Mendes de Leon*), ... 333
214. Uterine Mucous Membrane in the Second Stage of Metritis (*Van Tussenbroek and Mendes de Leon*), ... 333
215. Uterine Mucous Membrane in Third Stage of Metritis (*Van Tussenbroek and Mendes de Leon*), ... 333
216. Destruction of Cells by Pressure Atrophy (*Van Tussenbroek and Mendes de Leon*), ... 333
217. Vertical Section of the Uterine Mucous Membrane, the Upper Part of which Shows Inflammation, the Lower Hyperplasia (*Van Tussenbroek and Mendes de Leon*), ... 334
218. Decidual Metritis (*Ruge*), ... 335
219. Decidual Cells at 600 Diameters (*E. Ries*), ... 336
220. Uterus Enlarged from Chronic Metritis (*Byford*), ... 337
221. Salpingitis with Pelvic Peritonitis and Adhesion Posterior to the Uterus (*Heitzmann*), ... 345
222. Cross-section of Tube Affected with Suppurative Inflammation. × 26. (*Prepared by Evans from Author's Case*), ... 346
223. Interstitial and Purulent Salpingitis (*Byford*), ... 348
224. Pyosalpinx (*Freeborn*), ... 350
225. Hydrosalpinx without Adhesions (*Cullen*), ... 351
226. Double Hydrosalpinx (*Cullen*), ... 352
227. Changes in Ovary Due to Peripheral Oophoritis. Ovary Laid Open. (*Author's Case*), ... 355
228. Chronic Oophoritis of Peripheral Origin (*Petit and Bonnet*), ... 356
229. Suppurating Cyst of the Ovary and Suppurating Salpingitis (*Freeborn*), ... 357
230. Ovary Forceps, for Vaginal Oophorectomy. The Author's Model, . . 369
231. Pedicle Needle with Split Eye (*Binkley*), ... 370
232. Plastic Cellulitis of the Mesosalpinx, Secondary to Gonorrheal Salpingitis (*Bland Sutton*), ... 374
233. Pyosalpinx and Pelvic Abscess Opening into Rectum (*Byford*), . . . 380
234. Follicular Hemorrhage of the Ovary after Death from Extensive Burns (*Winckel*), ... 383
235. Follicular Hemorrhage of Right Ovary (Natural Size); Follicles about to Rupture (*Winckel*), ... 384
236. Chronic Interstitial Oophoritis. × 110. (*Prepared by Evans from Author's Case*), ... 386
237. Benign Ovarian Endothelioma (*M. Dixon Jones*), ... 387
238. Shape and Growth of the Gonococcus (*Bumm*), ... 392
239. Gonococci from Case of Puerperal Sepsis (*Prepared by Evans from Burr's Case*), ... 392
240. Gonococci in the Epithelial Layer of Mucous Membrane of the Bladder (*Wertheim*), ... 395
241. Superficial Location of Gonococci on the Mucosa in Chronic Gonorrheal Inflammation of the Cervical Cavity, Squamous Epithelium Taking the Place of the Normal Cylindrical Epithelium (*Bumm*), . 396

FIG. PAGE
242. Chronic Gonorrhea of the Endometrium (*Bumm*), ... 397
243. Gonorrheal Tube, Inflamed Broad Ligament, and Wall of Ovarian Abscess (*Wertheim*), ... 398
244. One of the Accumulations of Pus Cells under the "Intact" Peritoneum, with Numerous Gonococci within the Pus Cells (*Wertheim*), . . 399
245. Gonorrheal Abscess of the Left Ovary (*Wertheim*), ... 400
246. Culture of Gonococci in Peptone-agar and Human Blood-serum Twenty-four Hours Old (*Wertheim*), ... 407
247. Section from the Edge of a Superficial Colony of Gonococci after Seventy-two Hours (*Wertheim*), ... 407
248. Tuberculosis of the Cervix Uteri. × 150. (*Cornil*), ... 421
249. Diffuse Tuberculosis of the Uterus (*Barnes*), ... 424
250. Tuberculosis of the Fallopian Tubes (*Author's Case*), ... 426
251. Same as Fig. 250. Tubes Cut Transversely in Two, Showing Lumen, 427
252. Tubercular Pyosalpinx (*Freeborn*), ... 427
253. Thick-walled Abscess of Ovary Found in Connection with Tubercular Salpingitis and Containing a Thin Grayish Fluid (*Author's Case*), . 429
254. Tuberculosis of the Peritoneum. × 60. (*Prepared by Evans from the Author's Case*), ... 432
255. Commencing Squamous-cell Carcinoma of the Vaginal Portion (*Schroeder and Hofmeier*), ... 447
256. Advanced Squamous-cell Carcinoma of Vaginal Portion drawn down to Vulva (*J. Williams*), ... 447
257. Sagittal Section of Cervix in Advanced Squamous-cell Carcinoma of the Vaginal Portion (*Winter-Riegel*), ... 448
258. Microscopic Section of Squamous-cell Carcinoma of Cervix (*Ruge and Veit*), ... 448
259. Microscopic Section of Squamous-cell Carcinoma of the Cervix. × 110. (*Prepared by Evans from Author's Case*), ... 449
260. Ulcerating Squamous-cell Carcinoma of Cervix (*J. Williams*), . . . 450
261. Ulcerating Carcinoma of Cervix (*Photographed from Author's Case*), . 450
262. Ulcerating Cylindrical-cell Carcinoma of Cervix (*Winter-Richter*), . . 452
263. Infiltrating Carcinoma of Vaginal Portion (*Winter-Richter*), ... 452
264. Cylindrical-cell Carcinoma Infiltrating Cervix, with but Little Ulceration (*J. Williams*), ... 452
265. Cylindrical-cell Carcinoma of the Cervix, Extending into the Parametrium on the Right (*Russell*), ... 453
266. Microscopic Section of Commencing Cylindrical-cell Carcinoma of Cervix (*Bonnet and Petit*), ... 454
267. Microbes Found in Uterine Carcinoma (*Vitalis Mueller*), ... 456
268. Other Microbes Found in Uterine Carcinoma (*Vitalis Mueller*), . . . 457
269. Relation of Os and Vaginal Fornices to Lacerated and Everted Cervix (*Byford*), ... 460
270. Relation of Os and Vaginal Fornices to Squamous-cell Carcinoma of Vaginal Portion (*Byford*), ... 460
271. Relation of Os and Vaginal Fornices to Infiltrating Carcinoma of Cervix (*Byford*), ... 460
272. Relation of Os and Vaginal Fornices to Projecting Uterine Myoma (*Byford*), ... 460
273. Relation of Os and Vaginal Fornices to Supravaginal Cervical Myoma (*Byford*) 460
274. High Amputation of the Cervix (Schematic) (*Byford*), ... 463
275. Cervic Amputated (Schematic) (*Byford*), ... 463
276. Broad Ligament Forceps. The Author's Model, ... 467

FIG. PAGE
277. Forceps Applied to Broad Ligaments and Uterus Cut Loose (*Byford*), 476
278. Diffuse Carcinoma of the Endometrium (*Winter-Richter*), ... 470
279. Circumscribed Carcinoma of the Endometrium (*Winter-Richter*), . . 470
280. Microscopic Section of Adenocarcinoma of the Endometrium (*Schroeder*), ... 471
281. Advanced Adenocarcinoma of Corpus Uteri (*Russell*), ... 471
282. Malignant Adenoma of Endometrium (*Ruge*), ... 472
283. Advanced Stage of Preceding Figure (*Ruge*), ... 472
284. Malignant Adenoma of Endometrium, Showing Beginning Typical Proliferation of Epithelium. × 115. (*Schoenheimer*), ... 472
285. Mouth of Uterine Gland, Showing Folding-in (Inversion) of Proliferating Walls in Malignant Adenoma (*Ruge*), ... 473
286. Advanced Stage of Intraglandular Proliferation (Inverting) in Malignant Adenoma (*Ruge*), ... 473
287. Section of the Uterus Containing Squamous-cell Carcinoma of the Endometrium (*Flaischlein*), ... 474
288. Microscopic Section of Squamous-cell Carcinoma of the Endometrium (*M. Hofmeier*), ... 475
289. Carcinoma of the Chorion (Deciduoma Malignum) at the Fundus Uteri (*Gottschalk*), ... 476
290. Microscopic Section of Carcinoma of the Chorion (*Sanger*), ... 476
291. Papillary Carcinoma of the Tube. ½ Size. (*Eckardt*), ... 480
292. Microscopic Section from Fig. 291 (*Eckardt*), ... 481
293. Malignant Papillary Ovarian Cystoma (*Pfannenstiel*), ... 483
294. Sarcoma of the Cervix. × 110. (*Prepared by Evans from Author's Case*), ... 488
295. Higher Power of Preceding Figure. × 640, ... 489
296. Diffuse Sarcoma of the Endometrium (*Winckel*), ... 490
297. Microscopic Section of Diffuse Sarcoma of the Endometrium (*Wyder*), ... 491
298. Microscopic Section of Sarcoma of the Uterine Wall (*Schroeder-Hofmeier*), ... 492
299. Sarcoma of the Walls of the Uterus (*Winckel*), ... 493
300. Lymphangio-endothelioma Cavernosum Hemorrhagicum of the Vagina (*Klein*), ... 496
301. Lymphangio-endothelioma of Vaginal Portion of Cervix (*Braetz*), . . 497
302. Lymphangio-endothelioma of Vaginal Portion of Cervix (*Braetz*), . . 498
303. Endothelioma of the Ovary. ⅔ Size. (*M. Voigt*), ... 499
304. Microscopic Section of Fig. 303 (*M. Voigt*), ... 501
305. Myxofibroma of the Vagina (*Evans' Preparation from J. B. Murphy's Case*), ... 503
306. Location of Uterine Myomas (*W. H. Byford*), ... 504
307. Microscopic Section of Uterine Myoma. × 480. (*Prepared by Evans from Author's Case*), ... 505
308. Subserous Myoma. ½ Size. (*Winckel*), ... 505
309. 310. } Intramural Myomas. ½ Size. (*Winckel*), ... 505
311. Subserous and Submucous Myomas. ½ Size. (*Winckel*), ... 506
312. Diffuse Adenomyoma of Uterus (*Cullen*), ... 507
313. Uterus Showing Intramural Myoma and Large Pediculated Myoma (*Byford*), ... 508
314. Intramural and Subserous Uterine Myomas. ½ Size. (*Joseph Bacon's Case*), ... 511

FIG. PAGE
315. Submucous Myoma that Simulated a Six-months' Pregnancy in a Nullipara (*Author's Case*), ... 520
316. Beginning Proliferating Cystoma of Ovary. Natural Size. (*Winckel*), 530
317. Ovarian Cyst, with Secondary Development of Smaller Cysts in Its Walls (*Doran*), ... 531
318. Ovarian Cystoma Weighing about 182 Pounds (*J. Price*), ... 531
319. Ovarian Cystoma Weighing 52 Pounds (*R. W. Crothers*), ... 532
320. Microscopic Examination of Fluid from Ovarian Tumors (*Atlee*), . . 533
321. Section Through Papillary Ovarian Cystoma, Showing Its Internal Surface (*Freeborn*), ... 534
322. Small Papillary Ovarian Cystoma, from the Periphery of the Right Ovary (*Pfannenstiel*), ... 535
323. Microscopic Section of Adenocystoma of Ovary × 110 (*Prepared by Evans from Author's Case*), ... 536
324. Mixed Proliferating Cystoma. The Edge of a Papillary Growth, Inner Surface of a Cyst (*Pfannenstiel*), ... 537
325. Dermoid Cyst, Emptied and Partly Inverted (*Photograph of Author's Case*), ... 538
326. Tait's Ovariotomy Trocar, ... 549
527. Spencer Wells' Pedicle Forceps, ... 540
328. Trocar for Use in Vaginal Ovariotomy, ... 541
329. Diagram of the Structure in and Adjacent to the Broad Ligament (*Doran*), ... 553
330. Papilloma of the Ovary (*Freeborn*), ... 558
331. Ampullar Pregnancy at the Tenth Week, Showing Complete Occlusion of the Ostium, ... 564
332. Isthmic Pregnancy (*Bland Sutton*), ... 565
333. Apoplectic Ovum, or Tubal Mole, and Tube after Tubal Abortion at Eight Weeks (*Author's Case*), ... 566
334. A Tubal Mole in Section (*Bland Sutton*), ... 567
335. Fetus of about Three-months' Development Removed from the Abdominal Cavity (*Case of Dr. F. Dickenson*), ... 568
336. Interstitial Pregnancy (*Poppel*), ... 569
337. Extra-uterine Pregnancy in Fifth Month. So-called Abdominal. One-third (*Zweifel*), ... 569
338. Section of Wall of Sac of Fig. 337 (*Zweifel*). 570
339. Decidual Cells from Fig. 338 (*Zweifel*), ... 570
340. Pregnancy of a Left Rudimentary Uterine Horn; Front View (*Heyfelder-Kussmaul*), ... 583
341. Retro-uterine Hematocele (*R. Barnes*), ... 585

MANUAL OF GYNECOLOGY.

PART ONE.

DIAGNOSIS AND TREATMENT.

CHAPTER I.

DIAGNOSIS.

The diagnosis of the diseases peculiar to women is greatly facilitated by following a somewhat definite method of investigating the case.

1. **History.** First of all a history should be taken, both for present need and future reference. After having, from the patient's narrative and some leading questions, determined that the case is gynecological, we should enter it in our books in about the following order:

Name. Residence. Age. Single, married, or widow. Occupation and social state and habits. General appearance.

2. **Childhood History.** Children's diseases. Any abnormal congenital or acquired conditions or diseases, and when first noticed.

Many pelvic diseases owe their origin to conditions existing in early life.

3. **Menstrual History.** Age of first menstruation, and condition of health at that time. Mode of commencement: whether regular or not, profuse or scanty, or painful.

Regularity and *length of intervals* since and at present time.

Duration and *amount of discharge* formerly and at present.

Appearance of discharge, whether clotted or stringy, or thin, light or dark red.

Is or has menstruation been *painful* at any time, and when. Character and place of pain. At what time with reference to the flow.

4. **Marital History.** How long married. If widow, how long. Number of children and ages of each. Abnormal features connected with each labor. Number of abortions,—dates and causes. Were any of them attended or followed by diseased conditions.

5. **Family History.** Sometimes it is desirable to inquire into the diseases, occupations, and habits of their parents and ancestors, with reference to hereditary tendencies.

6. **Sexual History.** In most cases the patient need not be embarrassed by direct questions upon this subject. If there is any great abnormality in the sexual relations, such as want of participation in the sexual act, or perverted function, she will be apt to speak of it or drop some hint. Some leading question after the symptoms have been recorded, such as, "Is there any other symptom bearing upon your condition?" or, "Is your husband healthy and natural in every respect?" will draw from her some mention of it, and indicate to us the propriety or importance of more direct interrogation.

7. **Symptoms.** How long sick, and since when have the severer symptoms been noticed. Place and character of pains, whether in head, back, iliac region, abdomen, etc. Are they worse upon arising in the morning, or after being on the feet and exercising.

Ask for the symptoms referable to urinary organs and rectum, whether painful evacuation, tenesmus, etc.

Notice general nutrition. Inquire into the condition of the digestion, both gastric and intestinal, and also of the nervous system, with reference to headache, hysteria, neurasthenia, former attack of paralysis, etc. Notice condition of respiratory and circulatory system. Examine the urine.

It is customary to use forms for the record of gynecological cases, but they are necessarily spread over a large space and filled with too much detail for any given case. One may use an ordinary blank-book and enter the facts in a certain order, and thus get a compactly written history from which all unnecessary matter is omitted, keeping the general order, as just described, in mind. Put down the name and residence of the patient and of her former physician, then her age, and occupation or social state, married or single. Then ask about the childhood history, and mark only what is noteworthy. Then record the age of first menstruation, and put only such other facts down as are unusual. Also put down the number of children and abortions, and anything unusual connected with them. Ask the date of the last pregnancy, and if the sickness dated from any of them. Then ask if she has pain in the back, iliac regions, limbs, head; also inquire for symptoms connected with urination, defecation, and digestion. Any general conditions bearing upon her disease are also noted. By this time we have made up our minds as to the desirability of an examination. In case of a virgin we endeavor, if possible, to make as complete a diagnosis as possible, for the purpose of avoiding a vaginal examination; but such diagnoses are often quite unsatisfactory, and in those instances in which an exact diagnosis is desirable an examination must usually be made.

EXAMINATION OF THE ABDOMEN.

8. In examining the abdomen we make use of four methods: Inspection, Palpation, Percussion, and Auscultation.

9. **Inspection** is of value in indicating the presence and position of abdominal or pelvic enlargements, and the general condition of the abdomen. As the patient lies on the back, with the clothes loosened, the umbilicus should be concave and the abdomen somewhat flattened around it.

In general distention of the abdomen from gases or ascites the umbilicus may be flat instead of concave, or may even bulge slightly from increased intra-abdominal pressure.

Tumors or enlarged organs are apt to cause a fullness that

Manipulation of patient.

is more marked in the neighborhood of their origin. The patient should breathe deeply while we watch the tumor, for by the motion of the skin over it we may detect its irregularities of surface and its attachment, if any, to the abdominal walls, and possibly to the place from which it originated. The abdomen may be watched while the patient changes her position, in order to demonstrate further its range of motion. When she raises her shoulders from the pillow, the recti flatten the abdomen somewhat, unless some resistant mass lies under them. Lineæ albicantes resulting from previous abdominal distention should be looked for.

Touching posterior abdominal walls.

10. **Palpation** often enables us to make a finished diagnosis. By using gentle pressure we can explore nearly every part of the abdominal and pelvic cavities. The fingers of both hands are pressed gently and steadily into the abdomen, either above, below, or laterally, and pushed deeper with each inspiration until the posterior abdominal walls are felt; then the fingers are shifted until all parts are gone over systematically and any abnormal conditions felt or their absence ascertained. The bowels should, if possible, have been thoroughly evacuated both of feces and gas, and the patient should be asked to take deep inspirations while the pressure is being made. Hardness, softness, tenderness, fluctuation, displaceability of parts, irregularities of surface, etc., enable us to differentiate between tumors, inflammation, fecal accumulation, fluids, inflammatory exudates, and the like. Pressure over the pelvic brim enables us to feel the connection of a pelvic tumor with the pelvis; pressure under the ribs, the connection with the liver, spleen, or kidneys. Palpation all around abdominal growths, with attempts at displacement in different directions, may demonstrate attachment to the intestines, omentum, pancreas, or abdominal walls, either posteriorly or anteriorly.

Differentiation.

Attachment.

11. **Percussion** gives us information as to the solid, liquid, or gaseous nature of the abdominal contents, and the extent of each.

We can map out the dull areas, and compare these areas in different positions. In free ascites the resonance will always be on the highest point. When fluid is encapsulated, or a tumor immovable, the dullness does not change with the position. Fluctuation is found in ascites and thin-walled cysts.

Percussion acts as an aid to palpation. Thus, a hard mass in the abdomen is usually dull on percussion, but may be resonant if it is an exudate involving intestinal coils. A gradual shading from dullness to resonance may denote either a thin edge of the mass, or adhesion of intestines to the edges. Slight resonance on superficial percussion, and dullness upon deep percussion (the fingers pressed firmly against the mass), may indicate a retroperitoneal growth, the intestines overlying.

12. **Auscultation.** Intestinal gurgling over a mass indicates either that it is retroperitoneal or that intestines are adherent in it, or are over it. Vascular murmurs may be heard over large uterine tumors, the pregnant uterus, and aneurysms. Friction sounds may sometimes be detected in peritonitis. The sounds of the fetal heart are also to be heard in the later months of pregnancy, something like the ticking of a watch.

EXAMINATION OF THE PELVIS.

13. **Preliminaries.** The bladder and bowels should be evacuated shortly before the examination; if practicable, the

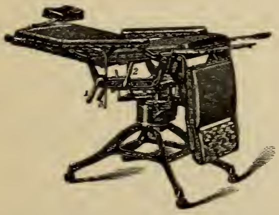


FIG. 1.—GYNECOLOGICAL CHAIR.

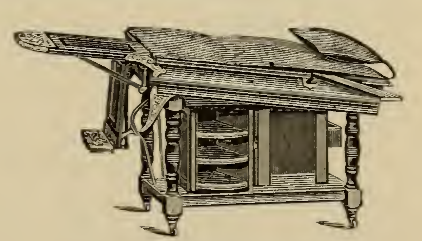


FIG. 2.—GYNECOLOGICAL TABLE FOR EXAMINATION.

bowels should have been moved by laxatives. A plain water enema and an antiseptic vaginal douche are also desirable. A properly constructed table or gynecological chair give much more satisfactory results than a bed or a sofa. The hands should be thoroughly washed and a good lubricator provided, such as soapy water, sterilized oil or vaselin, or soap ointment.

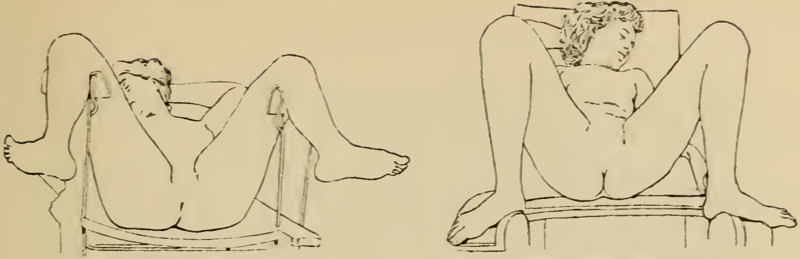
The last lubricant mentioned consists of one part of lard and two parts of soap shavings rubbed into an even mass by the aid of a little hot water. The ease with which it is washed off makes it valuable for use when several patients are to be examined in rapid succession. If it becomes too dry and hard by age, a little hot water readily softens it.

14. **Postures.** An examination may be made in the dorsal, the left-lateral, the genu-pectoral, and the standing postures, but the two latter are used only in determining the range of motion of the organs, and do not belong to ordinary routine examinations. Various modifications of the dorsal posture are used in operating.

15. **Dorsal Posture.** The patient is placed on the back with the feet drawn up against the nates and the knees separated, or the feet may be held by stirrups projecting a few inches from the end of the table, or the knees may be flexed on the abdomen.

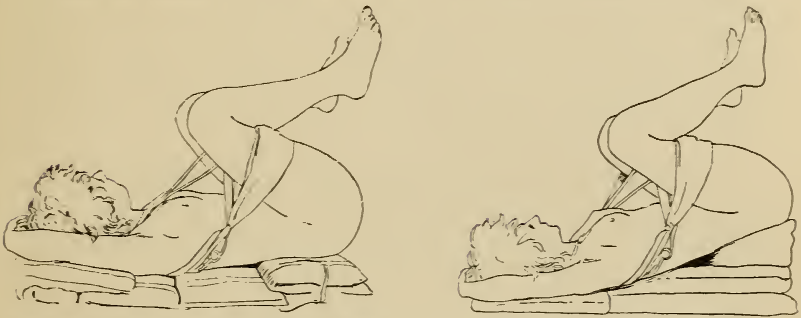
The first postures are used for ordinary office examinations, the last one for examinations under anesthesia. The dorsal postures are well adapted to digital, bimanual, rectal, and instrumental examinations, and all major and minor operations from below.

16. **The Left-lateral or Sims' Posture.** The patient is placed on her left side, with the nates near the lower left-hand corner of the table, the left arm behind the back, and both knees well flexed on the abdomen. The right or upper knee is flexed as far as possible, so as to extend over the under one and touch the table. The patient is thus thrown



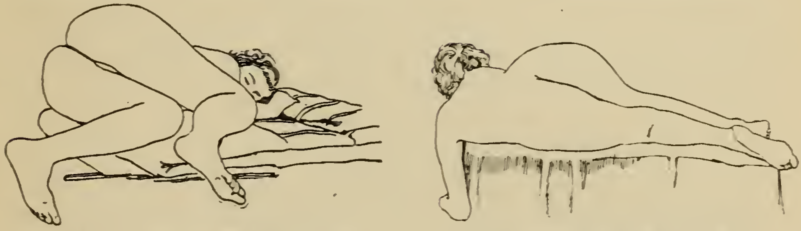
DORSAL RECUMBENT POSTURE.

THE DORSAL ELEVATED POSTURE.



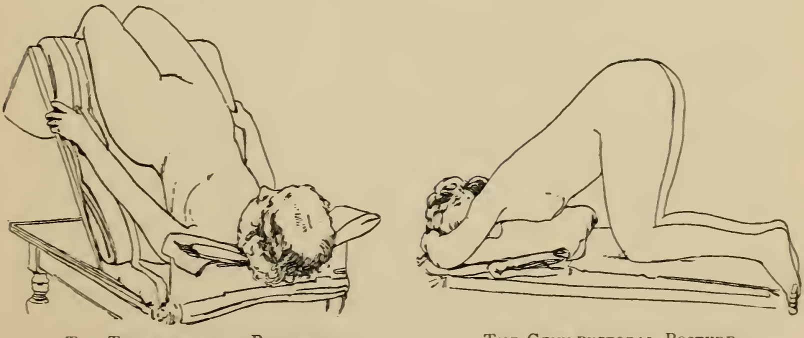
THE DORSO-SACRAL POSTURE.—Lateral View.

SACRAL ELEVATED POSTURE.



THE LEFT-LATERAL OR SIMS' POSTURE.—
Anterior View.

LEFT-LATERAL OR SIMS' POSTURE.—
Posterior View.



THE TRENDELENBURG POSTURE.

THE GENU-PECTORAL POSTURE.

FIG. 3.—GYNECOLOGICAL POSTURES. (*After Potter.*)

on the left breast, and the pubes and umbilicus are on a lower level than the coccyx and spine.

This posture is not as well adapted as the dorsal for the digital and bimanual examination, but is better for instrumental examination, vaginal tamponade and minor operations upon the cervix and anterior vaginal wall. When the speculum is introduced the uterus sinks away from the vulva, and the vaginal walls are expanded before the eye. The anterior vaginal wall may be pushed up out of the way by a retractor or Sims' depressor. The clothing should be loosened about the waist, in order to allow the contents of the abdomen and the anterior vaginal wall to sink away from the vulva.

17. **The Genu-pectoral or Knee-chest Posture.** The patient kneels near the edge of the table and, with head thrown back and face turned to one side, allows the chest to rest on a pillow in front of the knees.

The shoulders are lower than the hips, and the parts sink away and the vagina is expanded by atmospheric pressure as in the left lateral posture. The posture is valuable for internal inspection and vaginal tamponade in exceptional cases. When the chest is supported over the elbows the position is called the knee-elbow posture.

18. **The Standing Posture.** The patient stands upright with the feet slightly separated, so that the physician, kneeling on one knee before her, can introduce the finger in the vagina.

This posture is used to determine the position of the uterus, and to determine the extent of downward displacement or relaxation of the parts when the patient is on her feet.

19. There are three varieties of examination of the pelvic organs—the ocular, the digital, and the instrumental.

20. **The Ocular Examination, or Inspection.** The external genitals, vaginal orifice, and anus are inspected with the aid of palpation. The labia are separated, and the finger introduced as far as necessary into the vagina or anus to give a better exposure. In case of relaxation or laceration of the

vaginal entrance the patient should be asked to strain, and thus indicate the amount of relaxation or displacement. The color, relaxation, contraction, deformity, or displacement of the parts, exudates, ulcers, cicatrices, eruptions, varicose veins, tumors, hemorrhoids, fissures, etc., can thus be observed.

In many cases the absence of complaint on the part of the patient and the information derived by the digital examination make inspection unnecessary. It is well to postpone the exposure until the last thing, unless the symptoms direct attention to the external genitals, in order to minimize her embarrassment. Inspection of the vagina and cervix will be considered as a part of the instrumental examination.

21. **The Digital or Manual Examination.** There are two varieties of digital examination, viz., the simple digital, made with one or more fingers introduced into the vagina, rectum, or bladder; and the bimanual, which is the digital examination combined with counter-pressure over the lower abdomen by the other hand.

22. **Digital Examination of the Vagina** in the dorsal position is made as follows: The patient is covered by a sheet and the clothes pushed up over the knees. The fingers of the right hand, slightly flexed, are passed along the inside of the patient's left thigh, or of the left hand along the right thigh, until their dorsal surfaces touch the labia. The latter are then pressed apart with the thumb and third finger, while the index, gently extended, recognizes the perineum and glides over the fourchette if the parts be normal, or immediately into the unresisting orifice if there be relaxation or laceration.

Introduction of finger.

23. Enlargement, induration, or tenderness of the labia, relaxation, tightness, or sensitiveness of the vaginal entrance, will be recognized without extra manipulation, and indicate the necessity of an ocular inspection, or not.

Labia.

The firmness, softness, prolapse, or cicatricial character of the posterior vaginal wall at the outlet will probably next attract attention. By turning the palmar surface of the finger

Vagina.

forward, tenderness or bulging of the urethra or anterior vaginal wall should be felt for. As the finger passes further in, the vaginal walls feel somewhat like the inside of the cheeks, smooth and soft. The anterior wall is flat and somewhat resisting ; the posterior wall soft, with a thick ridge running longitudinally under it, formed by the collapsed rectum.

Cervix uteri.

24. After passing the vaginal entrance the finger should seek the cervix uteri, which projects into the vagina, and feels something like the end of a thick finger coming out of the anterior vaginal wall, about 2½ inches (7 cm.) from the pubic arch in the nullipara, or like a ball of the thumb in a multipara, or merely like a hardening of the end of the vaginal canal, with but little projection, in the old woman.

The vaginal portion of the cervix is, of course, smoother than the skin of the thumb or finger, and has a dimple or transverse depression in its center corresponding to the external os uteri. The size and shape vary within normal limits, the virgin cervix sometimes being as large as the end of the thumb, and the multiparous often much larger, and grooved by lacerations.

Position.

25. The long axis of the cervix should point downward and backward, so that the anterior wall is touched first, but it is often bent slightly forward or drawn to one side. When the anterior wall is touched and the extended finger brought up against the pubic arch, the finger impinges against the subpubic ligament between the second and third joints. When the finger tip is depressed it strikes the coccyx about an inch from the cervix. If the cervix is laterally located the depressed finger tip strikes the pelvic floor a little to one side of the coccyx. By pressing the finger tip laterally, the pelvic wall will be felt nearer the side of the displacement. The cervix should be displaceable in all directions, and afford an elastic resistance that returns it to its original position.

Relation.

Mobility.

Position and relation of corpus uteri.

26. The next thing to be sought is the corpus uteri. The finger tip, pressed up in the anterior fornix, should be able to

palpate the anterior uterine wall far enough to determine whether or not the uterine body is situated anteriorly. In some cases it can be felt inclining over and near the anterior vaginal wall. The lateral and posterior vaginal fornices should be elastic. If the body of the uterus be displaced laterally or posteriorly, the uterine wall can be traced upward on the side of the displacement. The fornix is also shallower, but wider on the side of the displacement.

The posterior fornix corresponding to the culdesac of Douglas may contain the fundus uteri, the prolapsed ovaries and Fallopian tubes, a uterine or an ovarian tumor, an exudate, a hematocele, prolapsed omentum, a malignant deposit, or be encroached upon by feces in the rectum. By hooking the finger tip against the posterior vaginal wall, just within the entrance and in the direction of the anus, the sphincter ani can be dilated and a small portion of the rectal mucous membrane forced into view.

The ureter may be felt by pressing the finger tip upward in the lateral vaginal fornix and drawing it forward and outward toward Poupart's ligament. It is felt as a cord passing backward and outward, and the fatty connective tissue external to it feels a trifle firmer.

27. Normal ovaries and tubes can not, as a rule, be felt by **Ovaries.** simple vaginal indagation. If they are enlarged, prolapsed, or adherent, or the pelvic tissues abnormally relaxed, they can be felt as bean-shaped or oblong bodies by pressing the finger beside or behind the cervix or against the lateral pelvic walls. Pelvic exudates or tumors are felt by reaching as high up as **Exudates.** possible in front, behind, and beside the uterus.

28. In making a *digital examination of the rectum*, the finger passes through the anus forward toward the posterior vaginal wall, and impinges against the anterior rectal wall and cervix. Then the finger is turned back and follows the sacrum until it passes the so-called third sphincter. The finger can **Posterior pelvic region.** be hooked over the sacro-uterine ligaments, between which it extends, and will often find an ovary or enlarged Fallopian tube in the culdesac of Douglas, or in one of the lateral

sacral pouches behind the broad ligaments. Exudates in the posterior pelvic region are thus palpated to much better advantage than through the vagina.

The coccyx can be grasped by the finger in the rectum and the thumb between the nates externally, and any tenderness, rigidity, ankylosis, fracture with non-union, faulty union, cartilaginous union, or displacement determined.

29. The *bimanual examination* in the dorsal posture requires that one hand be placed over different portions of the lower abdomen with fingers slightly extended. The fingers are pressed gently down into the pelvis, so as to carry the organs down within better reach of the vaginal finger, and hold the abdominal walls down for palpation of the pelvic organs against them from below. The lower hand may be either in the vagina or rectum, constituting the vaginal-bimanual and the rectal-bimanual examinations.

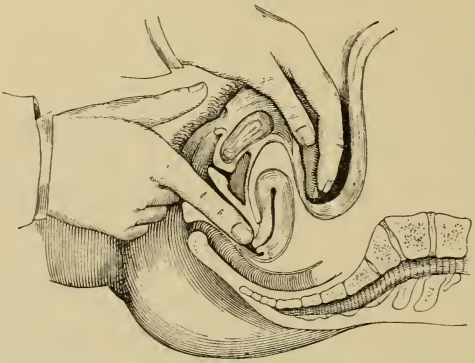


FIG. 4.—THE BIMANUAL EXAMINATION IN THE DORSAL POSTURE. (*Schroeder.*)

Pressing down pelvic organs.

The fingers of the two hands may be touched (the abdominal and vaginal walls intervening) behind, beside, and in front of the uterus, and moved about together until they touch the ovaries, Fallopian tubes, uterine and round ligaments, ureters, etc., or until these organs are felt to slip between them.

30. *Examination* in the *left-lateral* or *Sims' posture* requires that the surgeon stand at the foot of the table. The right or upper gluteal muscles are drawn up, while the forefinger is passed over the perineum to the vulvar depression at the fourchette, and then into the vagina. The parts are palpated much the same as in the dorsal postures. By pressing the other hand into the pelvic region from the abdominal walls a satisfactory bimanual examination can often be made. This posture is less disagreeable to the patient than the dorsal, particularly for rectal examinations, and may, in cases of doubtful diagnosis, supplement the other.

31. **Instrumental Examination.** The *uterine sound* is made of more or less flexible metal, usually copper, with

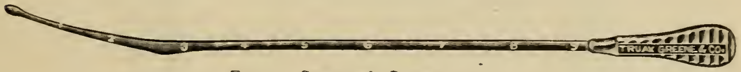


FIG. 5.—SIMPSON'S SOUND.

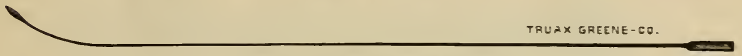


FIG. 6.—SIMS' SILVER PROBE.

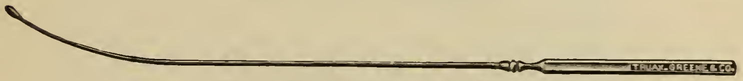


FIG. 7.—BUDD'S HARD-RUBBER PROBE.

a bulbous extremity about ⅛ of an inch, or 30 mm., in diameter. The uterine probe is smaller and more flexible, usually made of silver. The hard-rubber sound (Budd's) can be made to follow a curved or irregular-shaped uterine cavity. They are liable to carry pathogenic germs to an aseptic endometrium, and should only be used after an antiseptic vaginal douche, and after wiping out and disinfecting the vaginal fornices and cervix with a five per cent. carbolic acid solution through the speculum.

Antisepsis.

The sound tells us the direction and length of the uterine cavity and its relation to any mass felt near the cervix. Difficulty in its passage indicates flexion, contraction, or distortion; pain and the appearance of a trace of blood denote inflammation. It is sometimes used to replace the retroverted or retroflexed uterus. For ordinary use it is curved similar to a male urethral sound, but the amount of curvature varies according to the shape and size of the uterus.

32. The *vaginal speculum* consists of one or more concave blades, used separately or jointed, and is for the purpose of exposing the vaginal walls and cervix.

33. The *single-blade*, or *Sims' speculum* or retractor, is practically a flattened rod, bent at right angles, and made somewhat concave on the vaginal portion. As a rule, both ends are bent at right angles and are of different widths, thus making a double instrument. It is used in the left-lateral or Sims' posture. The nates are separated, the index finger placed in the concavity of the blade and introduced along the posterior vaginal wall behind the cervix. An assistant standing behind the patient then grasps the instrument firmly, and draws the posterior vaginal wall and perineum back with the right hand, and holds the right labium and nates up out of

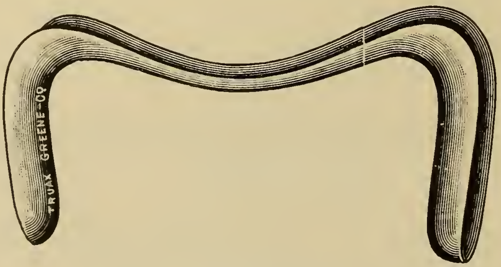


FIG. 8.—SIMS' SPECULUM.

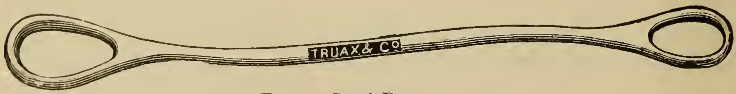


FIG. 9.—SIMS' DEPRESSOR.

the way with the left hand. The operator then presses the anterior vaginal wall away with a depressor, if gravity has not sufficiently done so, and draws the cervix to the vaginal entrance by means of a tenaculum.

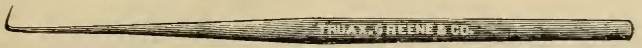


FIG. 10.—DUDLEY'S UTERINE TENACULUM.

The Sims' speculum is used for sounding the uterus, inspection of the cervix and vagina, intra-uterine treatment, vaginal tamponade, and minor operations upon the uterus and vagina. Its use requires an assistant. Several modifications and devices for holding it are in use which enable the operator to dispense with an assistant.

34. The *bivalve speculum* consists of two blades jointed at one end, and looks and opens something like the bill of a duck. The lower blade is usually a little longer than the upper one. It is introduced in the dorsal posture and then expanded, by a screw or lever. The finger is first introduced to discover the position of the cervix, and the speculum then

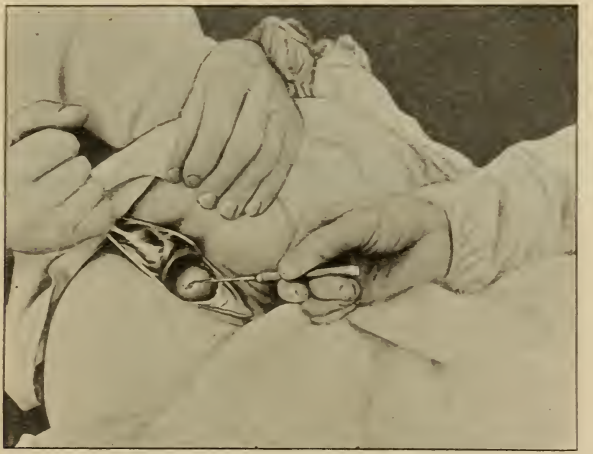


FIG. 11.—EXPOSURE OF CERVIX WITH SIMS' SPECULUM.

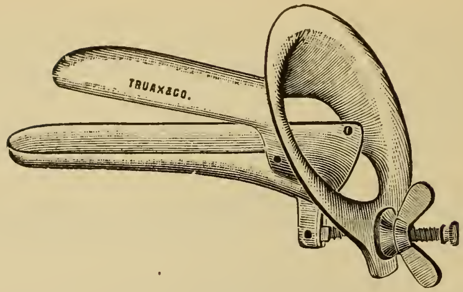


Fig. 12.—Higbee's Speculum.

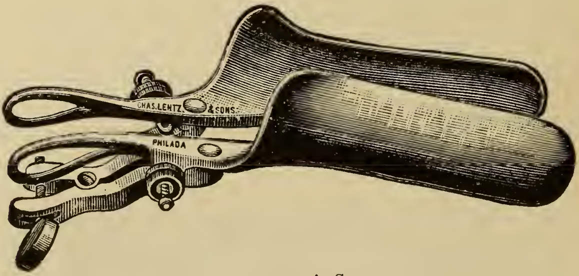


Fig. 13.—Goodell's Speculum.

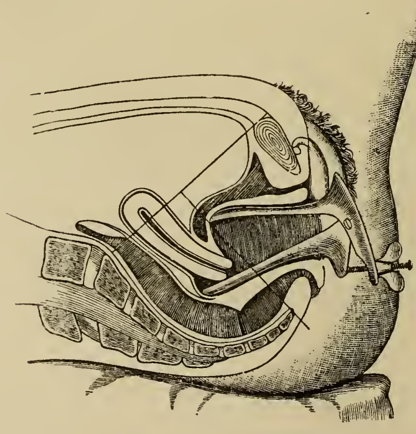


Fig. 14.—Bivalve Speculum Introduced.

passed along the finger as the latter is withdrawn, and pushed on until the end passes under the cervix. As the speculum is expanded the cervix settles on the lower or longer blade. If it does not, it may be pulled into better view by the sound introduced into the external os, or the speculum may be shifted.

The bivalve does not expose the vaginal wall as well as the Sims speculum, nor allow the cervix to be drawn as near to the vaginal entrance. It is employed almost exclusively for inspecting the cervix, for sounding the uterus, and for intra-uterine treatment. It is used without an assistant.

35. The *trivalve speculum* (Nelson and Nott) has two narrow blades in place of the anterior blade of the bivalve.

36. *Simon's retractors*, variously modified, are used for

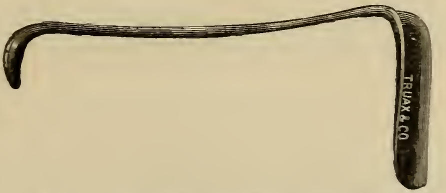


Fig. 15.—Jackson's Perineal Retractor.

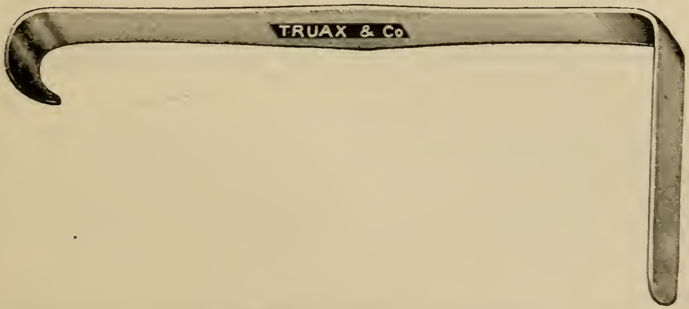


Fig. 16.—Lateral Vaginal Retractors.

minor and major gynecological operations. The broad, short blade bent at a right, or at a slightly acute, angle is used in the dorsal position to retract the posterior vaginal wall, and longer, narrower ones for the anterior and lateral walls. The cervix is pulled down by a hook or vulsellum forceps.

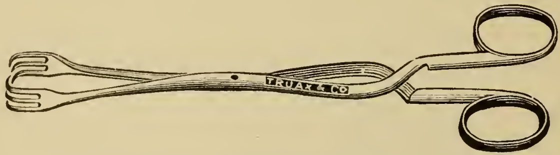


Fig. 17.—Vulsellum Forceps.

37. The *hook* and *vulsellum forceps* are also used to draw down the cervix for a better bimanual examination.

38. The *uterine dressing forceps* are ordinarily made something like a long, slender pair of scissors, with blades shaped to hold rather than to cut. They are used for wiping out the secretions with cotton, for introducing tampons, swabbing out the fornices with antiseptics, etc.

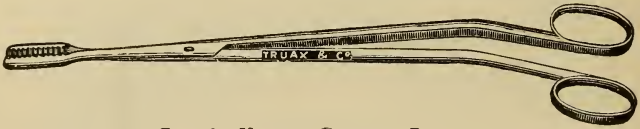


Fig. 18.—Uterine Dressing Forceps.

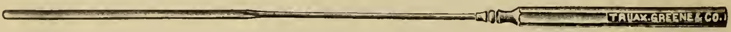


Fig. 19.—Uterine Applicator.

39. The *uterine applicator* is a slender, flattened, flexible silver rod, upon the end of which cotton is wrapped for the purpose of swabbing out the endometrium or cervix with fluids.

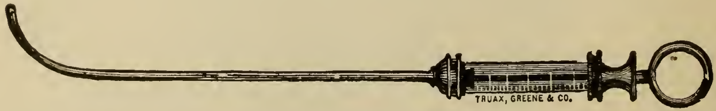


Fig. 20.—Braun's Uterine Syringe.

40. The *uterine syringe* is a small piston syringe with a

long, slender, curved nozzle for the injection of tincture of iodin or other fluids into the uterus.

When intra-uterine injections are made, the cervix should be widely dilated and held so by dressing forceps or dilators while the injection is made. Otherwise uterine colic or regurgitation into the Fallopian tubes and peritoneal cavity may occur.

41. *Uterine dilators* are used for intra-uterine examination, treatment, or operation. Slippery elm, sponge, sea tangle, and tupelo tents are sometimes used when a patient can not endure the pain of rapid instrumental dilation, nor is able to take an anesthetic. (See chap. IV, par. 13.)

Tents are liable to give rise to septic infection, and must be thoroughly sterilized, used with antiseptic precautions, and not allowed to remain longer than six or eight hours. If a larger one is to follow the first, the cervix and vagina must be douched out with an efficient antiseptic before the second one is introduced.

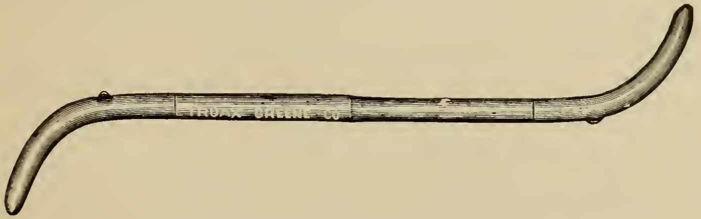


FIG 21.—BLOCK-TIN UTERINE DILATOR. THE AUTHOR'S MODEL.

42. The *round, hard dilators* are useful for intra-uterine treatment and drainage, and preliminary to Vulliet's method of dilation by gauze strips. (Chap. IV, par. 16.) Hard-rubber, slightly conical dilators (Hanks') or steel male urethral sounds may be used, commencing with a smaller size and increasing it. As these are inflexible, block-tin sounds are often used, which may be bent to follow the uterine curve.

43. The *bladed dilators* are for rapid dilation under anesthesia, and are used for operating rather than examining. They consist of two or three blades which form a round dilator

when closed, and by means of strong handles can be separated to any required extent. If the cervix is small, lateral incisions of the cervix may follow the dilation, and thus give better access to the uterine cavity. The incision should be sutured immediately after the examination or operation.

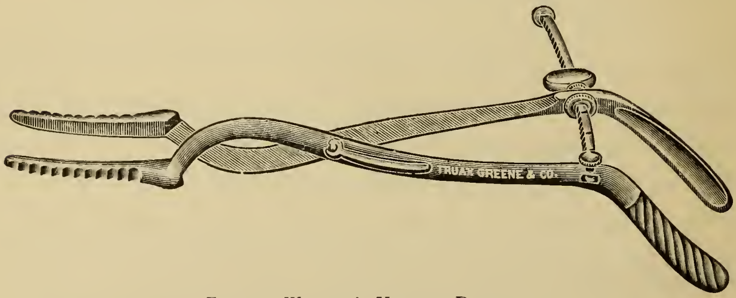


Fig. 22.—Wathen's Uterine Dilator.

The danger of bladed dilators is that they will be expanded too quickly and forcibly, and lacerate tissue. Pelvic abscess and peritonitis have often followed their careless and too vigorous use.

44. *Dilation of the urethra* sufficient to admit the finger is effected by the round, hard dilators under anesthesia, and must be done slowly for fear of laceration and permanent impairment of its contracting power.

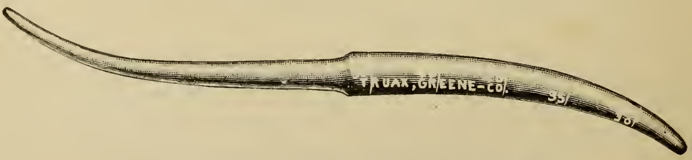


Fig. 23.—Urethral Dilator. The Author's Model.

45. *Dilation of the anus* is accomplished by the thumbs and fingers or by large olive-shaped dilators. The half-hand may be introduced, but as a rule two fingers will reach as far as necessary for any examination. Permanent impairment of function is liable to follow over-distention of the sphincter.

46. The *uterine scarificator* is used mainly for puncturing glandular cysts of the cervix. It is a fine rod with a spear or bayonet point. The bayonet or triangular point is preferable, as the orifice made gapes open, allows the fluid to escape better, and remains open.

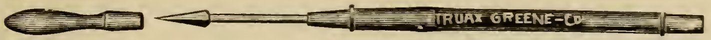


FIG. 24 —TROCAR-POINTED CERVICAL SCARIFICATOR. THE AUTHOR'S MODEL.

47. The *uterine curette* is a sound with a loop or spoon-shaped extremity, intended to scrape out the uterine contents, or even the mucous surface. For diagnosis a dull one is preferred, while for the operation of curetting, one with a medium sharp copper edge, or even with a sharp steel edge, is employed. The cervix should always be dilated first.

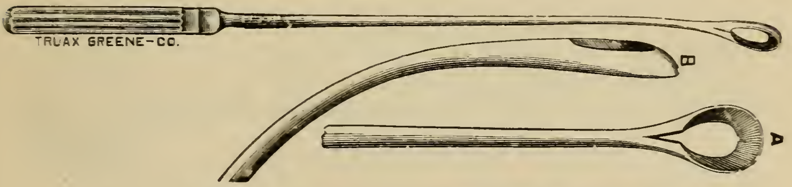


FIG. 25.—MEDIUM UTERINE SHARP CURETTE. THE AUTHOR'S MODEL.

48. The *aspirating syringe* is sometimes useful in drawing off fluid from cervical, retro-uterine, or vaginal cysts, etc., for diagnosis. An ordinary hypodermic syringe will often answer the same purpose.

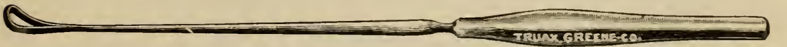


FIG. 26.—SIMS' SHARP UTERINE CURETTE.

49. The cystoscope, with accessory instruments,—the urethral calibrator, dilator, sucker, slender forceps, ureteral

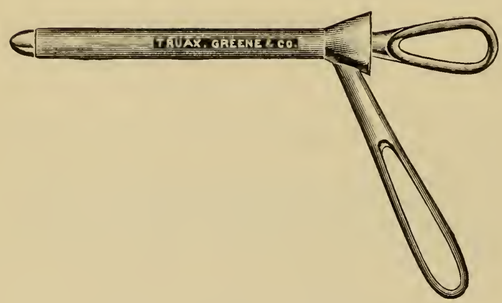


FIG. 27.—KELLY'S CYSTOSCOPE.

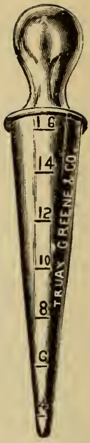


FIG. 28.—KELLY'S CALIBRATOR, FOR MEASURING SIZE OF URETHRA.

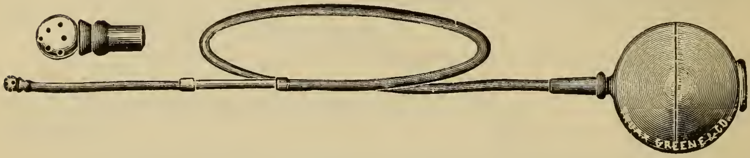


FIG. 29.—KELLY'S EVACUATOR, FOR REMOVING RESIDUAL URINE.

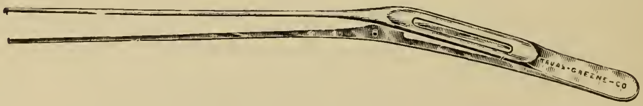


FIG. 30.—AUTHOR'S MODIFICATION OF KELLY'S BLADDER FORCEPS.

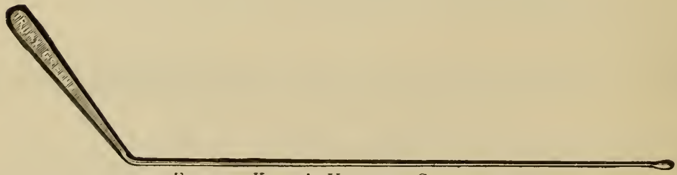


FIG. 31.—KELLY'S URETERAL SEARCHER.

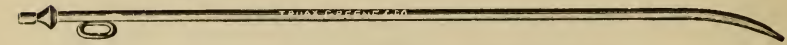


FIG. 32.—KELLY'S URETERAL CATHETER.

catheter and searcher,—when used in the sacral-elevated posture, permits of a complete exposure and treatment of the bladder walls, as well as exposure and catheterization of the ureters. A head-light, or a head-mirror with reflected light, is necessary, and can be used in an ordinary room with the curtains down. (See Chap. IV, par. 5.)

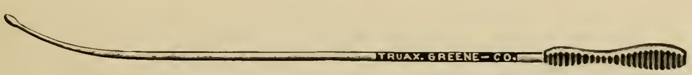


Fig. 33.—Whalebone Ureteral Guide. The Author's Model.

50. *Return catheters* and *return uterine irrigating tubes*, which consist of two tubes united, are valuable, but the latter may be dispensed with when the cervix is well dilated and an ordinary glass tube be used.

51. *Examination under an anesthetic* is very often necessary for an exact diagnosis in obscure pelvic affections. The relaxation of the abdominal and perineal muscles, as well as uterine ligaments, often makes the bimanual palpation infinitely more satisfactory than without it. For dilation and thorough inspection of the cavities it is also invaluable. It should always be resorted to in cases of doubtful diagnosis.

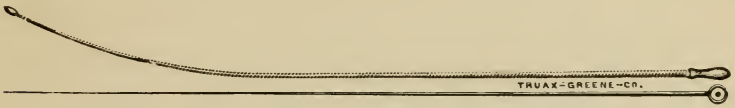


Fig. 34.—Spiral Ureteral Sound. The Author's Model.

CHAPTER II.

GYNECOLOGICAL TECHNIC.

ASEPTIC AND ANTISEPTIC DETAIL. PREPARATION FOR OPERATIONS.

Perfect antiseptic detail.

1. The practice of gynecology is largely surgical, necessitating a thorough training in surgery on the part of the gynecologist. This applies especially to the antiseptic principle. No gynecological examination or surgical maneuvers should be attempted without the employment of the most perfect antiseptic details.

Strong germicides.

Renewal.

2. *Perfect cleanliness or asepsis of the skin* is, for mechanical reasons, not always attainable. Germicides must therefore be used, and should be powerful enough to kill instantaneously all germs with which they come in contact. When prolonged antisepsis is to be maintained, an occasional renewal of the application of the antiseptic is necessary, particularly when the skin has within a short time been exposed to the more virulent kind of microbes.

Germs sometimes lodge in minute folds of the skin or under the finger-nails, or may even penetrate into the glandular or epithelial structures, and thus are not always reached either by the soap, nail-brush, or germicide. Spores may be present which develop after the antiseptic solution has been washed off. For these reasons the mechanical cleansing maneuvers with nail-brush and soap are of primary importance.

Efficient germicides.

Weak solutions.

3. The *antiseptics* that have been demonstrated to be the most efficient are a 1 : 2000 solution of corrosive mercuric chlorid in water, acidulated by the addition of 0.5 per cent. of tartaric acid; a five per cent. solution of carbolic acid; and a 1 : 5000 solution of lactate of silver (Credé). These require but a few moments' contact. Weaker solutions must be kept

Inefficient antiseptics.

in contact with the hands or material to be disinfected for a much longer time, and should not ordinarily be depended upon. Alcohol, spirits of turpentine, or thymol and boracic acid in solution, should not be relied upon, except as makeshifts when the stronger antiseptics are contra-indicated ; their action, while beneficial, does not secure perfect antisepsis.

The silver solutions, whose reputation depends as yet upon the observation of Credé, have the advantage of being harmless and nonirritating. The sublimate solution is weakened during use upon secreting or bleeding surfaces by the formation of an insoluble albuminate of mercury. According to Laplace, the addition of one-half of one per cent. of tartaric acid to the solution will prevent this precipitation.

If the weaker solutions of antiseptic agents are used, and the hands or instruments become contaminated during an operation, by pus or decomposing tissues or secretions, then merely dipping them into the weaker solutions at hand will not destroy the contamination quickly enough, and the antisepsis becomes imperfect.

Baths.

Clothes.

4. *Personal cleanliness* or asepsis requires that the gynecologist take frequent warm baths, and, if practicable, an occasional Turkish hot-air bath, and that he keep his fingernails short, and avoid contact with septic matter for as long a period as possible before making examinations or performing operations. The operator should wear a fresh-washed linen or white flannel suit, and clean rubber or canvas shoes. For minor operations it may answer to put a large linen gown over the ordinary clothes. The forearms should be bare.

Hands soaked, scrubbed, and disinfected.

The hands and forearms are best prepared by soaking them for five minutes in soapy water at a temperature of about 105° F., then scrubbing them with a nail-brush for five minutes (in case of recent contact with sepsis, for ten minutes) with green soft soap in frequent changes of water at the same temperature. They should then be scrubbed in strong alcohol for two minutes to dissolve out the remaining impurities. A 1 : 2000 solution of corrosive mercuric chlorid in warm water should then be rubbed into the cuticle and finger-nails for two or three minutes, and the hands soaked in the solution for one or two minutes longer. Every half hour during a long operation, or after each con-

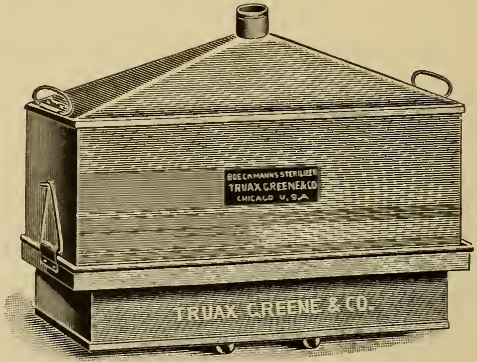


Fig. 35.—Boeckmann Combined Sterilizer, Closed.

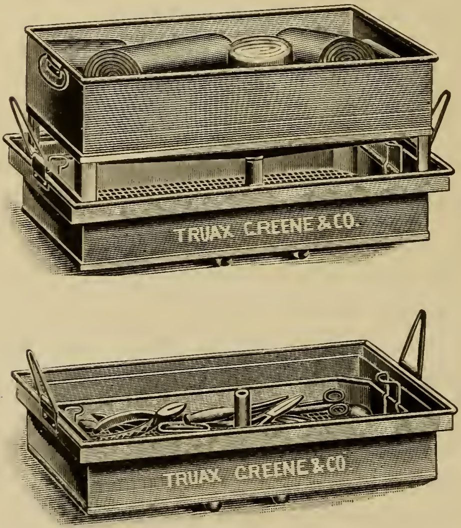

TRUAX GREENE & CO.
TRUAX GREENE & CO.

Fig. 36.—Same Uncovered, Showing Instrument-tray Below.

Renewal of antiseptic.

tact with septic secretion, the hands should be dipped in the antiseptic solution.

When the 1 : 2000 corrosive mercuric chlorid or five per cent. carbolic solutions are too irritating, the hands, after being washed, can be scrubbed for *five* minutes in a 1 : 3000 corrosive mercuric chlorid or a 2½ per cent. carbolic acid solution, and then from a half to one minute in the stronger solution. Another method is to soak the hands in a saturated aqueous solution of potassium permanganate until they are stained a deep mahogany red, and then in a saturated aqueous solution of oxalic acid until they are bleached again, and then in sterilized water.

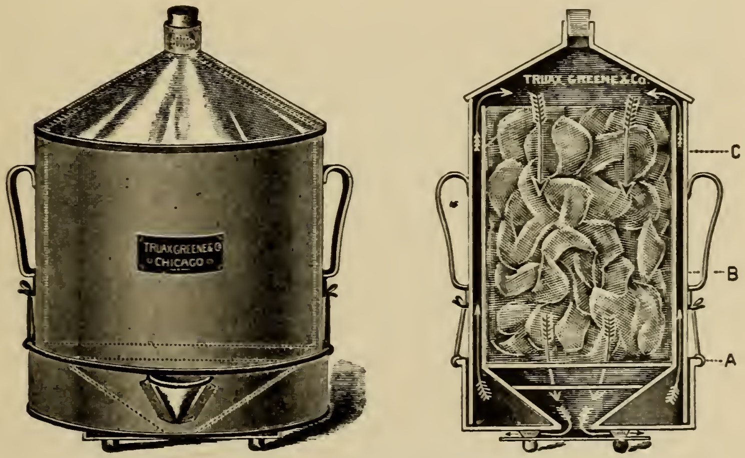


FIG. 37.—BOECKMANN HOSPITAL STERILIZER.

Instruments.

Dressings.

Sponges.

5. *Instruments* and *silk ligatures* should be sterilized by being boiled in a weak solution of sodium carbonate from one-quarter to one-half hour, or by steam heat at the same temperature. *Dressings* that are not injured by heat and water may be boiled, but are better treated by steam heat and then dried by heat (this is easily accomplished by means of a steam sterilizer, such as Boeckmann's). Sea sponges should be thoroughly pounded to remove the sand, and thoroughly washed in warm soapsuds, soaked for twenty-four hours in a two per

cent. solution of dilute hydrochloric acid in water, and kept in a five per cent. solution of carbolic acid until needed.

Catgut.

Catgut should have the fatty tissue dissolved out by being soaked for forty-eight hours in sulphuric ether, the ether being renewed at the end of the first twenty-four hours. It should then be subjected to a dry heat of 180° F., or 100° C., for an hour to expel the moisture, and then to 250° F., or 120° C., for half an hour to sterilize it. In order to prevent infection and rapid disintegration of the catgut in the tissues, it may be hardened by soaking 200 parts of catgut by weight from three to seven days, according to the size of the catgut, in 100 parts by weight of 95 per cent. carbolic acid, one part of chromic acid, and 2000 parts of water. It is then transferred to absolute alcohol and kept in it.

Dry heat.

Chromic acid.

Another method is to expel the fat and moisture by exposing the catgut for one hour to a dry heat at 212° F., or 100° C., and then to sterilize it by suspending it in cumol in a covered dish, subjecting it by means of a sand-bath to 330° F., or 165° C., for one hour (Kelly-Krönig). It should be dried by the heat of the sand-bath, kept dry in a sterilized jar, and placed in a five per cent. solution of carbolic acid or a 1 : 1000 solution of corrosive mercuric chlorid a short time before being used.

Heated in cumol.

An easier method is to soak the catgut for forty-eight hours in a two to four per cent. aqueous solution of formalin. Then place it in running water (or in a large quantity frequently changed) for twelve hours to remove the formalin. Then boil in water for thirty minutes. That which is to be used within a day or two should be put in a 1 : 1000 solution of corrosive mercuric chlorid to which five per cent. of glycerin has been added. The formalin prevents infection and rapid absorption of the gut. When thus prepared it will stand boiling.

Formalin method.

Silkworm-gut sutures should be washed in warm soapsuds and in alcohol, each for five minutes, and then be kept in a five per cent. solution of carbolic acid in water.

Silkworm-gut.

Drainage-tubes.

For ordinary abdominal sections straight glass *drainage-tubes* are used, resembling test-tubes, perforated near the bottom. The lumen should be less than one cm., or ⅓ of an inch, in diameter. They should be boiled and kept in a five per cent. solution of carbolic acid. Rubber drainage-tubing should also be boiled and kept in the same solution.

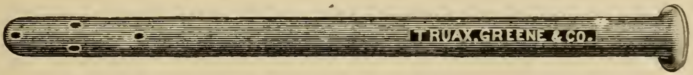


Fig. 38.—Glass Drainage-tube for Use in Abdominal Section.

It is better to boil fresh silk ligatures each time before using, but if any be left over they can be kept for a week or so in a five per cent. solution of carbolic acid in water without material injury. It is better to boil or steam the instruments immediately after as well as before operations, Silkworm-gut sutures are apt to become rough and brittle by boiling. steaming, or prolonged immersion in strong mercuric solutions.

Iodoform gauze is made by soaking three yards, or 300 cm., of sterilized gauze in six ounces, or 200 cm., of a one per cent. solution of carbolic acid in soapsuds in which 20 per cent. of iodoform powder is stirred. Strips three and eight cm., or one and three inches, wide and two or three yards, or 200 or 300 cm., long should be kept in closed sterilized jars ready for use.

Patient.

6. A thorough *disinfection of the patient* is necessary before performing operations in which the peritoneal cavity or deep connective tissue is exposed. The clothing, the external surface of the body, the alimentary canal, the genital and urinary canals, all require attention.

Minor operations on superficial tissues do not always require such extended disinfection, because the wound can be disinfected by the application of a 1 : 2000 corrosive mercuric chlorid solution just before the sutures are closed, or can be closed under continuous irrigation.

Surface of body.

7. The *patient's hair* should be brushed, and then washed with soap and then with alcohol. A hot bath, with a thorough soaping of the body and subsequent rubbing to

remove the loose cuticle and adherent secretions, should be given, and the armpits, feet, and groins disinfected with the 1 : 2000 corrosive chlorid solution. The pubic and vulval hair should be shaved off and the parts be disinfected.

Field of operation. The skin over the field of the operation in abdominal sections should be thoroughly scrubbed with soft soap and water, then with alcohol, after which a compress of soft soap is put on for two or three hours. Then the soap is washed off, and a compress moistened with a 1 : 4000 solution of corrosive mercuric chlorid is put on and kept there until the patient is on the operating table.

The nearer these preparations are to the operation, the less intervening septic contact is to be feared. The attendant who prepares the patient should prepare herself first.

8. *Preparations of the alimentary canal* should be commenced from thirty-six to forty-eight hours before the operation. **Laxatives and enemas.** A laxative should be given at bedtime two nights before the day set, with the object of emptying the intestines as completely as possible the day before. Four or five grains (0.25 to 0.35 gm.) of calomel is the most efficient, and should be followed in the morning by a saline, such as half an ounce (15 gm.) of salts. Later in the day one or two stimulating enemas (glycerin and water 1 : 3; or equal parts of glycerin, salts, and water). On the morning of the operation a plain water enema is given to wash out the rectum.

The calomel should produce dark-green or brown evacuations. The salines should be given in quantities to produce, with the aid of the enema, from six to eight stools, and therefore in some cases must be repeated during the day. Two or three stools do not empty the intestines sufficiently of both gases and solids for an operation during which the peritoneal cavity is to be opened, or the sphincter ani is to be sutured. Minor operations can, however, be safely performed without such vigorous laxative measures.

9. The *diet* should, on the day before the operation, consist mainly of liquids that contain but little fatty substances, and are easily digested, such as milk (preferably skimmed), thin gruels, and broths. Liquid diet.

Fatty and rich foods predispose to gases, particularly at a time when the duodenal secretions are being hurried through the alimentary canal. The object of such diet is to avoid, as far as possible, all matter that is not perfectly and completely digested, or, not being perfectly digested, will leave the smallest residuum, and be the least liable to undergo septic changes.

10. *Intestinal antiseptics* should be given while the laxatives are acting and the diet is being restricted. Thirty grains (two gm.) of bismuth subcarb., and seven grains (0.50 gm.) of salol four times a day, about an hour after taking nourishment, act well. Half an ounce (15 c.c.) of brandy, and one dram (4 c.c.) of the compound tincture of cardamom, may be given as a local and general stimulant four times daily during the dieting period to debilitated or septic patients. Disinfection of alimentary canal. Stimulants.

Almost any antiseptic that will not dissolve in the stomach nor depress the system may be given. The calomel given as a laxative, and the resulting increased flow of bile through the intestinal canal, also have a local antiseptic action. Resorcin grains five, or third of a gram, magnesium grains ten, or two-thirds of a gram, and various other antiseptics have been used with good effect.

11. For four hours previous to the administration of the anesthetic no fluids should be given, except an ounce (32 c.c.) of brandy slightly diluted fifteen minutes before.

The brandy stimulates the circulation, and incidentally has an exhilarating effect upon the patient that makes it easier for her to submit to preliminaries.

12. The genital canal should also be disinfected. The so-called four douches are about the best, and consist first of a copious vaginal douche of hot soapsuds, secondly of a plain douche to wash out the soap, thirdly of a copious 1 : 2000 The four douches.

warm aqueous solution of corrosive mercuric chlorid, and, lastly, of a plain sterilized hot-water douche to wash out the mercury. These douches should be given just before the general bath and skin disinfection, and again as near the operation as may be, and allow her time for rest before the anesthetic is administered.

Previous twice-daily sterilized hot vaginal douches for a week or so are desirable, combined, if there be a septic endometritis, with the daily intra-uterine application of an antiseptic, such as a 1 : 1000 corrosive chlorid solution, a ten per cent. solution carbolic acid in alcohol, or a 25 per cent. solution of ichthyol in glycerin. Before making the intra-uterine application a hot douche should be given, and the fornices be swabbed out with the antiseptic.

Pus.

13. A *urinalysis* should be made as soon as the operation is determined upon, and if pus or evidence of sepsis be found, the bladder should be washed out twice daily with a saturated solution of boracic acid or a normal 0.6 per cent. solution of sodium chlorid, and an ounce be left in the bladder each time. Acidity of the urine should be corrected by ant-acids given by mouth, such as half a dram (two gm.) of sodium bicarbonate, four times daily.

Acidity.

A deficiency in the solids or the presence of albumin, pus, or sugar, may contra-indicate either the anesthesia or the operation. Albumin and pus may forbid the administration of the anesthetic, while sugar or bile in the urine may contra-indicate the operation. A full twenty-four-hour specimen should be examined.

CHAPTER III.

GYNECOLOGICAL TECHNIC (*Continued*).

THE ARMAMENTARIUM.

1. It is not within the scope of this manual to describe the operating room and outfit of a hospital, but to give a sum-

mary of the articles to be provided for private operations, and explain their arrangement. Systematic careful preparation is even more necessary to successful operating than unusual skill.

2. **Dressings.** The nurse should have the following dressings sterilized and ready for use, in covered jars or wrapped in sterilized towels: Plain or iodoform gauze in broad layers, folded, and also in strips of such width as are required for the case; absorbent cotton, a sheet, from one to two dozen soft towels, bandages, safety pins, a blanket, stockings, flannel night-dresses, handkerchiefs, etc., for use about the patient. Also from six to a dozen well-prepared new sea sponges, or several dozen gauze pads made by sewing together several square pieces of gauze about ten centimeters, or four inches, in diameter. For abdominal sections a few large gauze pads twice this size, or large flat sea sponges, are needed to cover the intestines, and for minor operations numerous small crumpled or folded pieces of gauze, as well as gowns or clothing and rubber shoes for operators and nurses.

The nurse should possess a hypodermic syringe, a catheter, sharp scissors, a clinical thermometer, a medicine graduate, a dropper, and a pair of forceps.

3. **Medicines.** Hypodermic tablets of morphin, atropin, strychnin, and nitroglycerin, and some fresh tincture of digitalis, for hypodermic use. Brandy, anesthetics, solution of ferric subsulphate, iodoform, collodion, glycerin, one pound (450 gm.) of 95 per cent., and half a gallon (two kilos) of five per cent. carbolic acid, a few tablets of corrosive mercuric chlorid, and half a gallon (two kilos) of a 1 : 500 solution of the corrosive chlorid. A laxative, such as sulphate of magnesia or Rubinat water, also green or washing soap, hot and cold boiled water in large quantity, eight or ten pounds (four or five kilos) of stick sulphur.

4. **Apparatus.** An operating table (preferably a narrow, high one), several chairs, and two good-sized or four small

tables for instruments, sponges, solutions, etc.; oiled cloths to put under and on table. A blanket or pad for table. Disinfected boilers or tin pails, with covers, for sterilized water. Several large jars for carbolic and mercurial solutions. Four wash basins, two pitchers, and a dipper. A thermometer to test fluids. A clean slop-jar or pail. Two fountain syringes with slender glass irrigating points, and a hook to hang them on. Three pans or large, deep dishes for instruments and ligatures. A vomit-bowl, a gag, and tongue forceps. Bottles for hot water, to be placed about patient in bed.

All apparatus, medicine bottles, furniture and woodwork of the room should be thoroughly scrubbed with soap (the walls wiped with a damp cloth), and then with a 1 : 2000 solution of corrosive mercuric chlorid, or five per cent. carbolic acid.

As everything is thus disinfected, it is put in the cleaned operating room with all dressings. The cracks about the doors are sealed by pasting papers along them, and several pounds of sulphur are burned in a metal pot placed in a pan of water. The room is kept closed for three or more hours, and is then aired and arranged for the operation by nurses dressed in freshly washed garments. When two nurses are available it is better for one nurse to attend to the preparation of the room and the other to that of the patient.

Sulphur fumigation is not now generally used. I employ it, however, in hospital wards, and in houses in which there has been sepsis, because, although not necessary in most cases, it adds perfection to our technic without doing harm. Modern operating rooms can be perfectly cleansed without it.

5. **Arrangement.** The table should be padded with a folded blanket, covered by waterproof material and a sheet. A piece of oiled cloth or rubber, with edges folded up, or a Kelly pad, should be placed across the center of the table in abdominal sections, or at the foot in operations about the

perineum and vagina, to catch the fluids and carry them into the pail underneath.

In abdominal sections I have found the arrangement in the illustration (Fig. 39) the most convenient. The head of the patient is placed toward the window. A framework that can be placed on the table and be made to raise the lower portion of the patient's body at an angle of 45° (Trendelenburg's posture, Figs. 40 and 41), is of great value in operations requiring work within the pelvis.

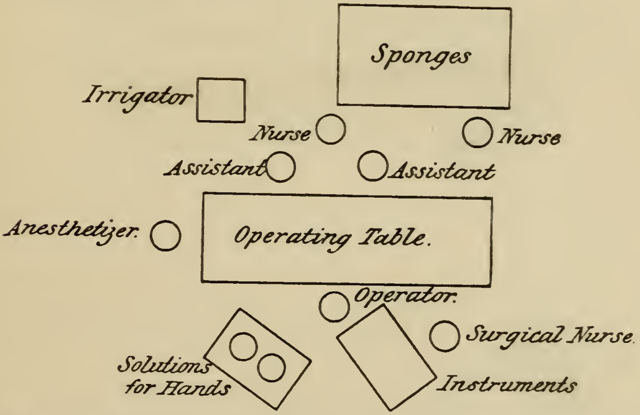


FIG. 39.—ARRANGEMENT OF TABLES AND ASSISTANTS FOR ABDOMINAL SECTION.

In operations about the vulva or vagina, in the dorsal posture, the knees should be held well over the body by legholders (Fig. 3). The instruments should be on the operator's right side, and the sponges and irrigating bags on the left.

Plenty of assistants should be available : one for the anesthetic, two regular assistants, a nurse for the sponges, another to change water, fill bags, etc., and a nurse or assistant to look after needles, instruments, drainage-tubes, gauze, etc.

Calculations should be made beforehand for every step of the operation, that it may proceed rapidly and yet without hurry or confusion.

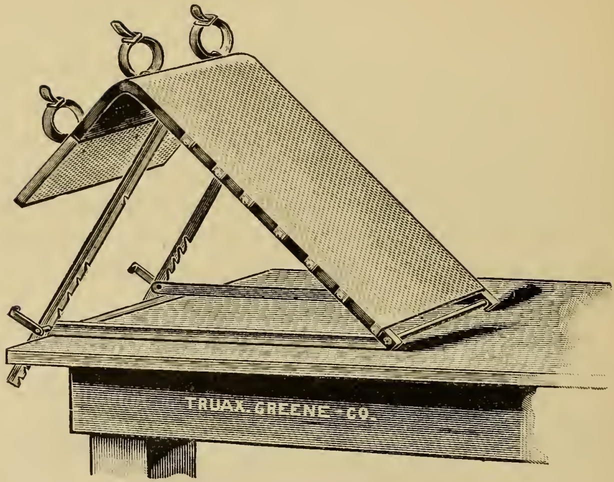


FIG. 40.—FRAME FOR TRENDELENBERG'S POSTURE AS IN FIG. 41.

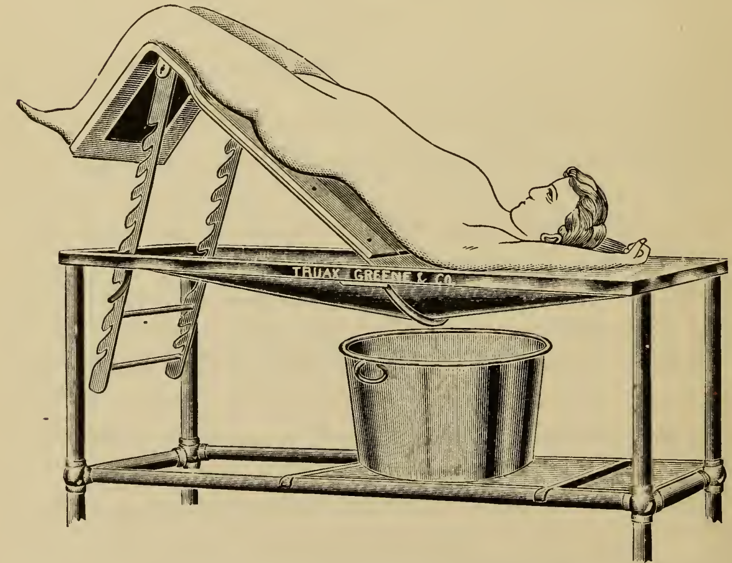

TRUAX, GREENE & CO.

FIG. 41.—TRENDELENBURG'S POSTURE ON EDEBOHL'S TABLE.

CHAPTER IV.

GYNECOLOGICAL TECHNIC (*Continued*).

OPERATIVE DETAIL.

1. **Beginning the Operation.** When an *abdominal section* is about to be commenced, the antiseptic compress is removed, the abdomen scrubbed with soft soapsuds, then with alcohol, and finally with a 1 : 2000 solution of corrosive mercuric chlorid, and a sterilized towel placed over the pubes, another over the chest and epigastrium, and one on each side of the abdomen, leaving a square or rectangular sterilized area of skin exposed.

Scrubbing and disinfection.

Isolating the area.

When an operation about the *vagina* or *perineum* is to be done, the vulva and vaginal walls are scrubbed, by means of gauze, with soapsuds, then with alcohol, and then with the 1 : 2000 corrosive mercuric chlorid solution. Ordinarily the cervix should be dilated, the endometrium wiped out, mildly curetted, and douched out with the mercuric solution, followed by a plain, sterilized douche; or, if the occasion requires a thorough curetting, the uterus should be swabbed out with strong carbolic acid.

Disinfection of vagina.

Of endometrium.

2. **Finishing the Operation.** At the conclusion of an *abdominal section* the skin about the incision should be washed off with the corrosive mercuric chlorid solution, dried, and covered with narrow strips of sterilized gauze, and a folded piece of gauze two inches wide be laid over that. Two or three strips of adhesive plaster are then placed across the abdomen, to hold the gauze in place and support the sutures. A layer of absorbent cotton about an inch thick, and large enough to cover the abdomen, is put over that, and a thin flannel bandage is tightly pinned around the abdomen, extending from the ribs below the trochanters. The bandage

Disinfection of skin.

Dressings.

is unpinned and the adhesive straps cut in the median line on the eighth day for the removal of the sutures. The wound is then redressed, the adhesive straps pinned together where they were cut, and the bandage changed. The incision should thenceforth be washed off daily with a 1 : 2000 solution of corrosive mercuric chlorid until the edges are everywhere sealed by new skin.

Daily disinfection.

Vaginal dressing.

At operations on the *vagina*, long strips of iodoform gauze an inch, three cm., wide are pushed into it until it is loosely filled, and are left there for forty-eight hours. They are then removed, and the vagina douched out with the 1 : 2000 corrosive chlorid solution, and after that twice or three times daily with a one per cent. solution of carbolic acid.

Douches.

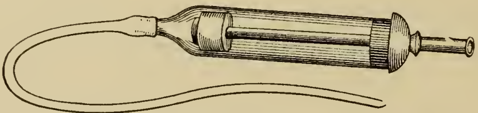


Fig. 42.—Syringe with Rubber Tube Attached for Emptying Drainage-tube.

I never use powders of any kind upon closed incisions, as several years' experience with sterilized gauze applied directly to the wound has convinced me that the latter dries the wound more thoroughly and gives more nearly perfect results.

When a drainage-tube is used, a square piece of rubber dam one foot, or five cm., is perforated in the middle and slipped over the tube, which should barely protrude from the lower angle of the wound. The tube is then emptied by means of a glass syringe, to which a small rubber tube long enough to reach the bottom is attached, and a narrow strip of iodoform gauze carried to the bottom on a straight rod or sound. A folded piece of gauze is then put over the mouth of the tube, and the rubber dam folded and pinned over that.

The tube is emptied every hour until less than four c.c., or one dram, of fluid is found, then every two hours until it becomes clear or reduced to a few drops of pinkish serum, when the tube is withdrawn. The gauze on the wound is changed as often as it gets wet. Adhesive strips are not put on until the tube is out.

A *Mikulicz* drain consists of a square piece of iodoform gauze, to the center of which a sterilized string 18 inches (seven cm.) long is attached. The center of the gauze is pushed down to the surfaces to be drained, and the interior of the sac thus made is packed with strips of iodoform gauze, which, with the string and edges of the gauze sac, protrude at the lower angle of the wound. About one-quarter of the strips of gauze are removed each day, and the sac on the day after. A strip of fresh gauze may be placed into the collapsing opening, and be changed every four hours until the wound is closed.

3. **Removal of Sutures.** The *deep abdominal* sutures should be taken out on the eighth day. The adhesive strips are cut through in the median line, their edges turned back, the gauze removed, and the incision washed off with the corrosive mercuric chlorid solution. Each suture is pulled upon until the knot is raised, is then cut below the part that had lain above the surface, and drawn out. The incision is again washed with the antiseptic solution, covered with gauze as before, and closed by pinning the cut ends of the straps together. The *superficial* silkworm-gut sutures are taken out at the end of two weeks. (See par. 2.)

Disinfection.

Cervical and *perineal* sutures may be removed any time after ten days or two weeks, the former in Sims' posture, the latter in the dorsal. An antiseptic douche is given both before and after.

4. **Catheterization and the Bladder Douche.** It is inexcusable for a nurse or a surgeon to introduce a catheter after an operation without the aid of sight, for if it touches the external parts infection and cystitis will probably follow. If the catheter is of rubber or metal, it should be boiled before and after introduction ; if of glass (Kelly), it should either be boiled or scrubbed after use, and kept in a five per cent. carbolic solution. Sterilized vaselin, kept tightly covered, should be used as a lubricant. The vulva should be thoroughly washed before the maneuver, the hands disinfected, and the catheter and the instrument not be allowed to touch anything, not even the cleansed vulva, before passing into the urethra.

Introduction by sight.

Disinfection of catheter.

Of vaseline.

Of vulva.

Of hands.

The same precautions are observed in giving the bladder douche. To the catheter should be attached a tube connected with a funnel (Skene), just before the last drops of urine escape, and the irrigating fluid be poured into the funnel. In cases of cystitis a few ounces only should be allowed to enter the bladder before the funnel is depressed low enough to allow the fluid to return into it. This fluid is poured out of the funnel, the funnel elevated and fresh fluid poured in. The bladder should thus be partly filled and emptied six or eight times. A double irrigating catheter may also be used, one or two quarts of the fluid being passed slowly through it.

Washing out.

Irrigation.

A saturated solution of boracic acid in water or a normal (0.6 per cent.) salt solution are the best irrigating fluids, since the stronger antiseptic solutions are apt to prove irritating or toxic.

Mild solution.

5. **Catheterization of the Ureters.** The ureters were catheterized by Simon by means of digital palpation of their orifices through the dilated urethra. The most practical way, however, is Kelly's modification of Pawlick's method.

Simon's method.

Kelly-Pawlick.

The patient is anesthetized and the vagina and vulva are cleansed as for a minor surgical operation. She is then placed in the dorsal position, with the hips well elevated, or in the knee-chest position, the urethra is dilated by sounds, and a No. 12 or No. 14 cystocope is passed. With the latter introduced almost its entire length, the mouth of the ureter is sought. Illumination is furnished by an electric light on a reflector and a head-mirror, or by a light attached to the forehead. When the ureteral orifice, which is a slight elevation with a small slit or dimple in it, is found, the catheter is introduced and gently pushed in the direction of the sacro-iliac synchondrosis. If the pelvis of the kidney is to be entered, a flexible catheter must be used. (Figs. 27 to 34.)

After some practice it is possible to catheterize the ureter without general anesthesia. By placing a light applicator, armed with cotton and dipped in a 10 per cent. solution of cocain, in the urethra five minutes before the catheterization, the urethra can, as a rule, be almost painlessly dilated sufficiently for a No. 10 cystoscope to be passed. If the patient can not remain in the knee-chest position long enough, she can, after the bladder is distended with air, be turned on the back, with the hips somewhat elevated, to prevent the return of the intestines into the pelvis and the consequent collapse of the bladder. The end of the cystoscope must be directed well toward the anterior vaginal wall.

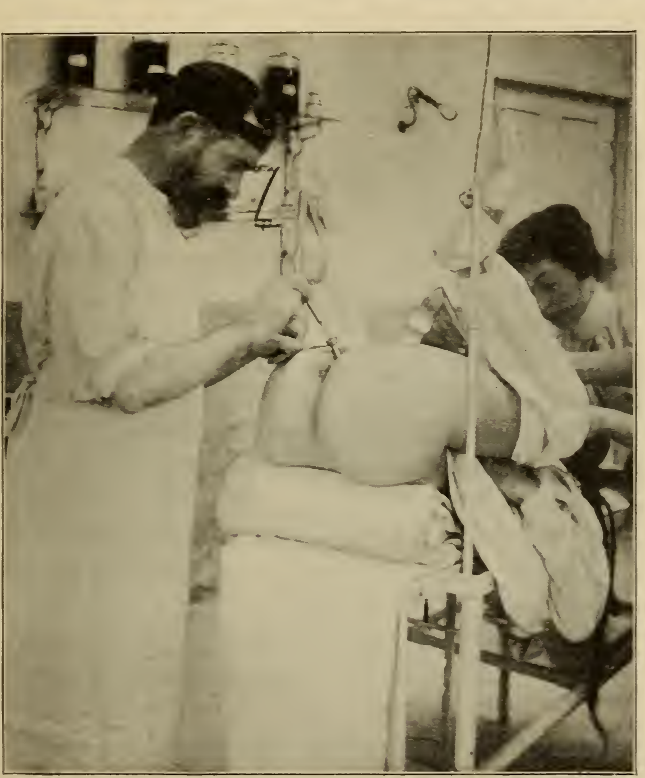


Fig. 43.—Ureteral Catheter passed into Left Ureter, showing Position of Patient and Direction of Cystoscope and Catheter.

The instruments required are: Nos. 8, 10, 12, and 14 cystoscopes; a set of urethral dilators; long, slender, mouse-toothed forceps, to wipe the mucous membrane; aluminum applicator; ureteral searcher; one metal and two flexible ureteral catheters; and a sucker to remove residual or accumulating urine (chap. I, par. 49).

Conditions. Vaginal. Disinfection.

6. **Exploratory Puncture** is only permissible when a satisfactory diagnosis can not be made without it, and when the danger of wounding large blood-vessels, or of causing an escape of the fluid into the abdominal cavity, can be excluded. The best place, when available, is in the posterior vaginal fornix, guided by the knowledge of the location of the rectum by previous rectal indagation. The lateral fornices, which are under the uterine arteries and ureter, as well as any pulsating vessels that can be felt by the examining finger, must be avoided. The four douches (chap. II, par. 12) should first be administered.

Abdominal. Disinfection. Median line.

The next place to be preferred is through the distended abdominal walls, which are first washed with soap, then with alcohol and ether, and finally with the 1 : 2000 solution of corrosive mercuric chlorid. The nearer the umbilicus the better, except along the courses of the epigastric arteries. The median line is the least vascular place.

Needle.

A small sterilized exploring needle, with suction either from a tight piston syringe, an aspirator, or an Allen pump, should be used.

Places. Method.

7. **Tapping.** The median line, a little below the umbilicus, and, occasionally, the posterior vaginal fornix, are the places of election. The surfaces are cleansed as directed for exploratory puncture. The steps are as follows: Put patient on the back. Make an incision in the skin just long enough to admit the trocar. Then plunge the trocar into the tumor, and con-

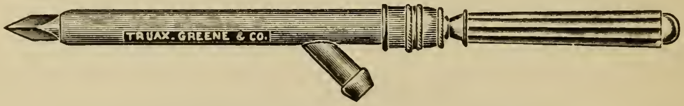


Fig. 44.—Emmet's Trocar for Tapping the Abdomen.

duct the fluid into a pail by means of a rubber tube previously attached to the trocar. Turn the patient on the side. When the fluid stops flowing put a strip of adhesive plaster over the wound, pin a tight bandage about the abdomen, and keep her in bed two or three days.

8. **Exploratory Abdominal Incision.** The exploratory abdominal incision is usually made in the median line from about midway between the umbilicus and pubes downward about three cm., or a little over an inch, long. The preparation of the patient should be similar to that for an abdominal section (chap. II, par. 6). See paragraph I of this chapter for preliminaries.

Place.

Preparation.

Method.

A free incision with bold strokes is made down to the dense fascia covering the rectus muscles. A very short, oblique incision is made through this, and if the edges of the recti muscles are not seen, the septum is sought by the probe-pointed scissors, and, when found, the fascia is slit up with them to the extent of the wound. The recti are then separated by the knife-handle, and the fascia underneath is grasped by two pairs of forceps, which are held by an assistant, and is drawn up and cut between them until the forceps separate widely. The cut tissues are then again slit up to the extent of the incision by the scissors, which usually lays the peritoneum bare. This is then caught up with the forceps and carefully incised between them. As soon as it is cut through, the intestines fall away from the surface, and a small, dark hole is visible. The peritoneal opening is enlarged with the scissors or a probe-pointed bistoury. Hemostatic forceps are applied to spurting vessels. When the tissues are unusually vascular, the bladder is apt to be in the way, and should be avoided by keeping higher up.

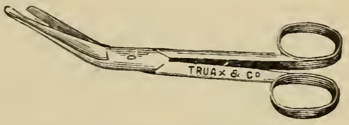


FIG. 45.—THE AUTHOR'S PROBE-POINTED FASCIA SCISSORS.

Two fingers are introduced and the fundus uteri sought for.

To find the ovaries

From the uterus the fingers trace the Fallopian tubes toward the ovaries, which may be raised to the surface.

If necessary, the incision can be enlarged upward to, or around the left side of and beyond, the umbilicus, or downward toward the pubes.

Closure of wound.

In closing the wound, silkworm-gut sutures are introduced a little less than a centimeter, or ⅓ of an inch, from the edge, and the same distance apart. They should embrace all of the tissues of the abdominal walls and a thin edge of the peritoneum. The rectus muscle and firm fascial layers should be held out with forceps so as to be deeply grasped, or they will not be firmly coapted, and a hernia will be liable to result. In closing a long incision I always place a row of buried silkworm-gut sutures three cm., or one inch, apart, which include only the fascia, the edges of the recti, and the peritoneum. A flat sponge is placed over the intestines under long incisions until the sutures are placed and partly tied, and when it is removed the omentum, if accessible, is drawn down in its place. After the deep sutures are tied superficial ones are placed between them, to prevent eversion of the edges.

Some operators prefer to unite the peritoneal edges with a continuous suture of catgut before introducing the deep sutures. Others unite the peritoneum, the deep fascia, and the superficial fascia, each with a separate row of continuous stitches. One thread may be used for all by running the first suture from the upper end of the wound to the lower, along the peritoneal edges, then back along the edges of the deep fascia to the upper end, and tying both ends. The same thread then sutures the skin and superficial fascia down to the lower end. Any deep incised wound can thus be coapted by this method of tier-sutures.

The instruments required are a knife, probe-pointed scissors or blunt-pointed bistoury, several hemostatic forceps, a tenaculum, needle-holder, sponge-holders, tissue forceps, and needles. Silkworm-gut, gauze, adhesive plaster, sterilized cotton, and bandages are also necessary.

9. **Exploratory Vaginal Incision.** The exploratory vaginal incision is made in the posterior vaginal fornix. The

Place.

preparation of the patient is the same as for an abdominal section, except the compress on the abdomen (chap. II, par. 6).

Method.

A silk ligature is passed through both lips of the cervix and tied, for use as a tractor. The perineal retractor is introduced and the cervix drawn toward the pubes. The vaginal wall is hooked up just behind the cervix, and an incision one inch, or three cm., long made in the median line extending from the cervix downward. The connective tissue is then hooked up and snipped with the scissors, and the maneuver repeated until a hole is made in the peritoneum. This is enlarged to admit the finger. The perineal retractor is withdrawn and the forefinger introduced into the recto-uterine culdesac and up behind the uterus and laterally to the ovaries. If necessary the peritoneal opening is enlarged, two fingers introduced, and the ovaries or fundus uteri are pulled down into view.

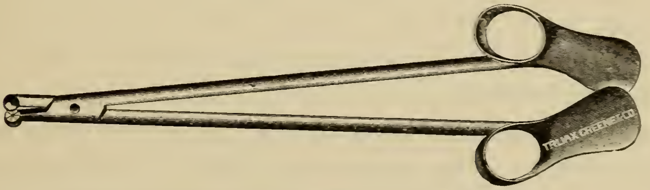


FIG. 46.—THE AUTHOR'S LONG-HANDLED NEEDLE FORCEPS.

The incision may be closed by three or four catgut sutures. The sutures can be introduced, guided by the fingers or finger still in the incision, and pulling it out near the vulva, or by means of the retractors and a tenaculum. In the latter case a small sponge attached to a silk thread should be kept in the culdesac until the sutures are ready to be tied. The vagina may be loosely packed with strips of iodoform gauze, to be left for forty-eight hours.

A transverse incision behind the cervix, or a T-shaped one in front of it, may be made, but these are less easily managed and are for operations rather than explorations. (Part VII, chap. XI, par. 13; and part VI, chap. IV, par. 19.)

The instruments required are a perineal retractor (Fig. 15), two lateral retractors (Fig. 16), a long-handled, sharp-pointed pair of scissors, a tenaculum, sponge holders, two or three pairs medium-long hemostatic forceps, long-handled needle forceps, and two or three straight needles three cm., or one inch, long. Medium-sized catgut and silkworm-gut and strips of sterilized gauze, fountain syringe, etc., should be provided.

10. **Vaginal Tamponade.** Vaginal tampons are used as the carriers of medicines, as mechanical supports to the pelvic organs, and as hemostatic agents.

Three uses.

When used as a *carrier of medicine*, the tampon is made of cotton or wool or gauze, large enough to cover the area to be treated. A piece of cotton or wool is folded into convenient shape, attached to a piece of thread, dipped in a mild solution of the medicine to be used, and, with the aid of a speculum, is placed under the cervix or in the upper vagina. The patient withdraws it at the end of twenty-four or thirty-six hours by means of the thread.

Moist.

Dry.

Some gynecologists (Engelmann) prefer to use dried medicated tampons. Others apply a powder, such as boracic acid, tannin, oxid of zinc, etc., to the parts, and use a dry tampon to keep it in place. Strips of medicated gauze are sometimes used to loosely fill the vagina. Each method has its advantages in certain cases. For applications to the cervix I prefer applying a small, moist, medicated cotton tampon under the cervix, and a dry wool tampon next to it to hold it in position.

Method preferred

The patient or nurse may sometimes be allowed to place it by means of a bivalve or tubular speculum.

11. As a *mechanical support* to the pelvic organs, surgeon's wool is generally used. It may be cut into strips, and be introduced so as to form a column (Bozeman) of wool in the vagina, or a strip may be folded and the ends tied. I prefer to draw out the wool into a loose layer, cut it into square, flat

Construction.

pieces, lay each on a thin piece of the best commercial cotton of the same size, draw the four corners together in such a way that the cotton layer will be on the outside of the ball thus produced, and then tie the four corners with a strong piece of thread long enough to hang out of the vulva. The cotton, which can be sterilized by dry heat if desirable, is less irritating to the vagina than the wool, and keeps dry longer. This is much lighter and more resilient than a wet tampon ; and it is preferable to apply any medicines that may be used for the cervix and vaginal fornices on a smaller cotton tampon above or beyond it.

They can be used through a bivalve speculum, the cervix being pushed as high as necessary by them as they are being introduced. When there is, however, considerable displacement, Sims' lateral, or the knee-chest, posture, which causes the uterus to recede from the vulva and the vagina to elongate and expand, are preferable.

12. As a *hemostatic agent* for uterine hemorrhage small pieces of cotton that have been soaked in a mild astringent solution, such as a 25 per cent. aqueous solution of ferric subsulphate (Monsel's solution), and dried, are used. They should be introduced by means of a Sims' speculum, and be systematically placed around and under the cervix, until the vagina is filled in such a manner that no insterstices are left between them through which the blood can trickle. The tampon may be left for twenty-four hours, and then be replaced if necessary.

Method of application.

Systematic packing.

In cases of severe uterine hemorrhage, the cervix should be dilated, the uterus curetted and disinfected, the uterine cavity tightly packed with a thin strip of iodoform gauze, and the vaginal fornices and lower vagina carefully and solidly filled with other strips.

The rectum and bladder should be evacuated and the vagina douched with an antiseptic solution before using the tampon.

13. **Dilation of the Cervix Uteri.** The cervix uteri may be dilated for the purpose of exploring its cavity, of establishing free drainage, or of developing a puerile cervix.

Three purposes.

14. *Gradual dilation* may be accomplished without an anesthetic by means of tents and round dilators or graded sounds. Tents and sounds.

Technic of slippery-el dilation.

When the cervix is very small, a slender, tapering tent, five cm., or two inches, long, can usually be whittled from a thick piece of slippery-elm bark that will enter without much difficulty. The surface, and with it the dirt, is carefully whittled off, the tent dipped in water, and its fibers slightly crushed from end to end by successive bites of the dressing forceps, in order to render it flexible. It is then curved, dipped in a five per cent. solution of carbolic acid in water, and introduced. In two or three minutes it is removed, and a larger one used in the same way. This is repeated every day or two with larger tents, or by introducing two or three side by side, until a block-tin sound, properly bent, can be introduced.

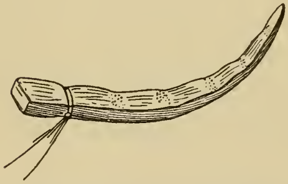


Fig. 47.—Slippery-elm Tent Whittled from Fresh Bark. (⅔ size.) The dots show the bites of the forceps.

Block-tin sounds (Fig. 21) may then be used as dilators Sounds. every day or two, increasing the size gradually until the limit is attained, as is indicated by the tolerance of the patient. Each dilation must be preceded by a thorough removal of the vaginal and cervical mucus by means of cotton pledgets, and by the swabbing out of the vaginal fornices and cervical cavity (as soon as the latter is large enough) with the five per cent. carbolic acid solution.

The dilation may be further increased by swabbing out the uterine cavity with the five per cent. carbolic solution, and introducing a sterilized sponge tent, to be left for six or eight Sponge tent. hours.

15. **Rapid Dilation** may be employed if still greater distention is required. The patient is anesthetized, the vagina douched and swabbed out with a 1 : 2000 solution of corrosive Disinfection. mercuric chlorid, vaginal retractors introduced, the cervix

grasped with vulsella, the tent removed, the uterus douched with the same solution, and the cervix dilated as widely as possible with bladed dilators (Fig. 22). If the uterus is to be explored, and the cervix shows signs of tearing before it is sufficiently dilated, a transverse vaginal incision may be made in front of the cervix, the bladder separated from it with the finger, and the anterior cervical wall be split up in the median line to or beyond the internal os. Bilateral and posterior incisions do not give such satisfactory access. (See part VI, chap. VIII, par. 16.) Incision of cervix.

In this way the finger can be introduced into a uterus of ordinary size, the cavity be explored, and a bimanual examination be made with the finger in the uterus. Digital exploration of uterus.

For drainage of the uterine cavity, treatment of the endometrium, and development of the cervix, dilation with the elm tents and sounds is usually sufficient. The length of time the dilation is maintained, rather than the amount, is of importance in stimulating the parts to increased development. Moderate dilation maintained.

16. **Vulliet's Method.** Instead of using the sponge tents or bladed dilators, Vulliet recommends packing the uterus with pledgets of sterilized cotton impregnated with iodoform, from the size of a pea to that of a lima-bean, which are changed and increased in quantity every second day for eight or ten times, or until the uterus will admit the finger. Packing the uterus.

These packings act as a powerful stimulant to the organ, but are liable to abrade the mucous membrane, and unless used in connection with a perfectly aseptic technic may give rise to a septic metritis and salpingitis. The method is, therefore, adapted only to hospital practice. Danger.

Iodoform gauze is often used instead of cotton pledgets, but it abrades the mucous membrane more quickly, and is not as well adapted to repeated packing.

Rapid dilation should not be undertaken in connection with septic inflammation of the adnexa, nor when the uterus is firmly fixed by adhesions. Dilation of the multiparous uterus requires extra care to avoid tearing through an old cicatrix into the parametrium or peritoneal cavity.

CHAPTER V.

THE PRINCIPLES OF GYNECOLOGICAL TREATMENT.

Varieties of douche.

1. **The Hot Vaginal Douche.** Besides the antiseptic vaginal douche for surgical purposes (chap. II, par. 12), the medicated douche for local disease of the vagina and cervix (part VII, chap. III, par. 13), and the cold douche for uterine hemorrhage (part IV, chap. III, par. 5), the *hot vaginal douche* from a fountain syringe is used as a remedy for pelvic congestion.

Temperature.

It should be taken at an uncomfortably high temperature, in order to stimulate the blood-vessels to contraction. It is best to begin at 100° F. and increase the temperature as fast as can be tolerated until 115° or 120° are reached. The duration should be fifteen or twenty minutes at a time, the frequency from two to four times daily.

Duration.

Frequency.

Posture.

The best posture is the dorsal, that the vagina may be filled, and the water be brought in as extensive relation as possible with the pelvic blood-vessels. Elevation of the hips renders the pelvic depletion more thorough, and the effect is prolonged if the patient remains in the recumbent position for an hour or two afterward. A normal solution of salt (0.6 per cent.) is preferable to plain water, as it interferes less with the secretions.

Elevation of hips.

Solution.

A douche pan, or piece of folded waterproof material, must be placed under the patient to carry the fluid into a pail beside the bed. A narrow bench with a pail under the projecting end is sometimes used. An attendant should fill the douche bag and regulate the temperature of the fluid. It is not necessary that the water should run into the vagina any faster than necessary to maintain the temperature.

Double use.

2. **The Sitzbath.** The sitzbath may be used either for increasing or diminishing pelvic hyperemia.

Hot.

When used as hot as can be borne it contracts the cutaneous vessels and favors pelvic hyperemia. The temperature should be increased from time to time in order to continue the superficial stimulation. It should be employed for fifteen or twenty minutes unless a feeling of faintness makes it desirable to discontinue it before. Duration.

When used between 95° and 98° F. the sitzbath relaxes the superficial capillaries, and thus has some effect in relieving pelvic congestion. It also reduces temperature, and has a sedative effect upon the nervous centers, promoting natural sleep. It should be continued for fifteen or twenty minutes, and should be made a little warmer if the patient feels at all chilly. Tepid. Effect. Duration.

When used between 80° and 90° F. for one or two minutes, followed by a rapid drying and covering of the surface, the superficial reaction has a powerful revulsive effect. Cool.

3. **Counterirritation.** Counterirritation may be transient, prolonged, or continuous. The usual places for counterirritation in gynecology are over the iliac, vesical, and sacral regions. Varieties. Places.

Transient counterirritation is best produced by dipping a thin cloth in chloroform liniment, spirits of turpentine, or a mixture of one part of the oil of turpentine in 20 or 30 of hot water, applying it to the surface, and covering it with flannel. In a short time the irritation becomes excessive and the compress must be removed. Such irritation is powerful, yet superficial, and can be frequently repeated. Method Effect.

Prolonged counterirritation may be produced by mustard or fly blisters, pustulation, or setons. These are, however, but little used in gynecology.

Continuous counterirritation is usually produced by the application once or twice daily of the pure or diluted tincture of iodin, until the applications become painful. Then they are omitted until the irritation has subsided, and used again as before, or not quite so often. In this way an almost constant counterirritation is maintained for weeks or months. Method.

Convalescents.

4. **Rest and Exercise.** The amount of rest and exercise taken by a patient should be carefully regulated. Convalescing patients should sit up at first for an hour at a time, and never more than two hours at a time until relieved of the acute symptoms.

Chronic cases. Systematic rest. Walks. Sponge baths. Calisthenics. Time for douches.

In chronic cases the patient should lie down two hours in the *middle* of each day. It does more harm than good for them to arise late, or to lie down early in the forenoon, because they have been resting all night and need exercise. If, on the contrary, they wait until late in the afternoon to lie down, they will have become tired out. When possible the patient should go out for a walk after breakfast, and again in the afternoon after the mid-day rest. A sponge bath before breakfast and at bedtime in summer, replaced by light calisthenics during the winter months, are to be encouraged. The best times for hot vaginal douches are before lying down at noon and at bedtime.

Exercise during convalescence can with advantage be taken in the dorsal posture, with one-pound dumb-bells, care being taken to keep the shoulders down. Various motions of the lower limbs, one limb at a time being put through a certain motion until tired, then another motion, etc. (Skene.)

Faradic. Method. Strength of current. Duration. As a stimulant.

5. **Electricity.** As a general local tonic for patients that are not able to take a sufficiency of active exercise, faradic electricity is of great utility. It is given in the following manner: Place an electrode of a coarse wire short current at the patient's feet, or on the back of her neck, and the other in the hand of an attendant, who successively passes her hand over the different motor areas of the patient's body. The current should not be strong enough to cause discomfort, and should be kept up for half an hour or longer. When thus used it takes the place of exercise and predisposes to natural sleep. A strong current continued for a short time acts as a stimulant.

When it is desirable to stimulate the pelvic organs, a positive vaginal electrode may be used, the negative being applied to different parts of the body.

Vaginal electrode.

Intra-uterine bipolar faradism is applied by means of a slender electrode containing both poles. It is used to stimulate the uterus to increased growth and function. The electrode may, after a thorough disinfection of the vagina, be used without a speculum. The current, at first mild, is gradually increased until it is as strong as it can be tolerated, continued for ten minutes, and gradually turned off. It should be used every second or third day (F. H. Martin).

Uterine stimulation.

6. **Massage.** Patients convalescing from acute pelvic diseases are greatly benefited by general massage. It should consist of stimulating the circulation in the extremities and muscles of the back by kneading and friction motions, carefully avoiding the abdomen. The seances at first should be short, and should not tire the patient too much. Later they may be continued for a half or whole hour. They should be repeated daily. Nervous patients may be treated in the evening by gentle friction movements, slowly executed and with but slight pressure.

Tonic and stimulant action.

Duration.

Frequency.

Sedative action.

7. *Abdominal massage* for constipation (Thuré Brandt) is executed somewhat as follows:

The masseur stands on the left side of the patient, who is lying down, and places the finger tips of both hands over the sigmoid flexure, the hands extending in opposite directions in the long axis of the patient's body. The contents of the sigmoid flexure are forced downward into the lower rectum by pressure and semicircular and stroking movements.

Emptying sigmoid flexure.

The hands are then placed side by side, the finger tips toward the head, and the motions are made higher up along the descending colon, with deep pressure in a downward direction in order to force the feces down into the parts previously emptied. In this way the whole colon is gone over.

Emptying colon.

Circular kneading.

Circular kneading with both hands laid on the abdomen is then practised, avoiding the umbilical region.

Shaking up.

Both hands are then pressed deeply into the lower abdomen, and the entire contents pressed up toward the diaphragm and gently shaken.

Standing.

In obstinate cases may be added massage, in the standing position, of both costo-iliac spaces simultaneously with the palms of the hands, and kneading of the colon from the cecum toward the sigmoid flexure.

Duration.

Caution.

The treatment should, if necessary, consume half an hour. It should not be executed upon patients with acute pelvic inflammation or congestion.

Nature.

8. *Pelvic massage* consists mainly in steadying the uterus by the finger in the vagina or rectum, and manipulating the uterus and its surroundings through the abdominal wall.

Positions of patient and operator.

The patient takes the dorsal position on a couch. The masseur sits at her left side on a chair low enough for his left elbow to rest on his knee, while he holds the forefinger, or two first fingers, in the vagina, or the finger in the rectum with or without the thumb in the vagina. The arm should pass under her thigh. The right hand is used on the abdomen.

Vaginal fingers passive.

Friction over uterus.

Vibratory movements.

Uterine ligaments.

9. To *massage the uterus* in normal position the vaginal finger presses the cervix upward and backward and remains motionless, except gradually to change its position and alter the direction of its pressure in supplementing the work of the other hand. The right hand makes gentle circular friction motions above the pubes and over Poupart's ligaments, gradually pressing deeper into the pelvis until the posterior surface of the uterus is reached. The uterus is then massaged by the same motions from the fundus toward the cervix for a few minutes, and stimulated by a few quick vibratory movements. Then the massage is executed over the sacro-uterine ligaments, followed by stroking movements from the uterus

towards the sacrum, to empty the veins and lymphatics. The same maneuvers are executed over the broad ligaments.

Stretching adhesions.

Stroking fornices.

Anodyne effect.

The uterus may be pressed in different directions to increase its mobility or stretch old adhesions, and the vaginal finger can, toward the end, stroke the vaginal fornices from the cervix laterally and posteriorly, to assist in emptying the vessels. The constant gentle circular motions of the abdominal hand have an anodyne effect upon the nerves, and render the manipulations much less irritating than in ordinary examinations. (Massage for special conditions will be mentioned in the appropriate places.)

Education of fingers.

10. *The ovarian regions* may be similarly massaged, without direct pressure upon the ovaries, and as the fingers come to recognize the relation of the parts old adhesions can be bimanually stretched.

Uses.

11. **Pelvic Gymnastics.** Pelvic gymnastics are used to diminish or increase the flow of blood to the pelvis, and to develop the pelvic musculature.

Dorsal muscles and abductors.

Position.

Resistance.

Standing.

To *diminish the flow to the pelvic organs* contractions of the muscles of the back and the abductors of the thigh are principally employed. The patient is put upon the back with the heels drawn up to the nates, and directed to raise the hips high from the couch, and separate her knees, while an attendant takes hold of them and affords resistance, and also to resist an attempt of the attendant to force them together. The patient also stands against a table and resists the attempts of the attendant to bend her body forward, etc.

Active exercises.

To *increase the flow of blood to the pelvis* all forms of active exercise may be used, particularly the flexing and extending of the body while in a standing position, and running motions of the limbs, with the feet and knees moving up and down, however, instead of forward.

Adductors and perineal muscles.

To *develop the pelvic muscles*, as well as to increase the flow of blood to the pelvis, forcible adduction of the thigh is employed in the dorsal position against pressure made by the patient or an assistant. She also contracts the perineum as in restraining a movement of the bowels. To lie on the back and rise to a sitting posture causes contraction of both the abdominal and perineal muscles.

Perineum.

Abdominal muscles.

12. **The Hygiene of Girlhood.** The foundation of the invalidism and unfruitfulness of American womanhood is laid in the first two decads of life. The American girl's habits are too sedentary and her activities too intellectual and emotional. The remedy lies in a reversal of these conditions.

Invalidism.

Habits.

Remedy.

More out-of-door exercise, more to eat, more sleep, less study, less music, less sewing, less reading, are indicated during the first decad. During the second decad a longer and easier course of instruction, with fewer hours of study and more hours of exercise, such as walking, horseback riding astride, moderate bicycling, gymnastics, games, and housework, should be the custom. It is better, physically, mentally, and morally, for a girl to complete her education at twenty-one than at eighteen, taking twice the time for her higher studies and gaining twice the time for exercise and recreation, thus establishing instead of ruining her health.

13. **Menstruation.** The girl should be forewarned, as the physical signs of puberty become evident, of the approach of menstruation ; and when it appears she should understand the necessity of the avoidance of fatigue or exposure to cold, as well as the manner of caring for herself. She should be taught to heed all ill feelings connected with the period, and to keep the bed if she has attacks of menorrhagia or dysmenorrhea. A large proportion of pelvic diseases are due to a want of such prudence.

Forewarning

Instruction.

Young women employed as seamstresses, clerks, and other steady occupations, should remain at home two or three days at each menstrual period, in the hope of preventing the uterine disease that sooner or later overtakes them if they continue their occupation long enough.

14. **Medicines.** By far the most frequent medicines used by the gynecologist are tonics. Iron, nux vomica, cod-liver oil, and hypophosphites, are the most useful.

Tonics.

The following are useful formulæ:

℞. Tinct. ferri. chlor. (tasteless), ... ʒvj, 25.00 c.c.
Acidi muriat. dil., or acidi phosphor. dil., . ʒij, 8.00 c.c.
Syr. acidi citrici, ... ℥iij, 90.00 c.c.
M.
Ft. sol.
Sig.—Teaspoonful after each meal in half a tumblerful of water.

℞. Ferri proto-chloridi, ... gr. xv, 1.00 gm.
Strychninæ, ... gr. j, 0.06 gm.
Quin. sulph., ... ʒss, 2.00 gm.
Extr. aloes soc., ... gr. v–xv, 0.33–1.00 gm.
M.
Ft. pil. no. xxv.
Sig.—One after each meal.

The aloes may be omitted if the bowels are regular. A dessertspoonful of the elixir of the chlorid, a teaspoonful of the syrup of the albuminate, or five grains (0.33 gm.) of the lactate of iron, in powder or capsule, are agreeable preparations.

15. *Laxatives* are often needed until a regular daily habit can be acquired. Habit. Patients who are not noticeably anemic, but digest poorly, are often benefited by three grains (0.20 gm.) of pil. hydrarg. every second night, followed the next morning by a seidlitz powder or other mild saline laxative. Anemic patients are sometimes benefited by such a dose every third night, while they are taking the tincture of iron. One grain of pil. hydrarg. (0.06 gm.) every night is an old favorite for torpid liver. The following has proved the best combination in my hands in breaking up an old habit of constipation:

℞. Pil. hydrarg., ... ʒss, 2.00 gm.
Podophyllin,
Aloin,
Ext. rhei,
Ext. nucis vomicæ,
Extr. belladonnæ, ... āā . . . gr. iv, 0.25 gm.
M.
Ft. pil. no. lx.
Sig.—One or two at bedtime every night.

Two may be taken every night in obstinate cases until the bowels act freely once every morning, then one every night as long as necessary. As a rule, the effect of two pills taken nightly is somewhat cumulative, and the dose must be reduced to one, and can finally be omitted.

To insure a daily evacuation of the bowels it is necessary to fill the stomach in the morning. If the patient has no appetite for breakfast, as is usually the case, she should drink water (preferably hot) or milk, or eat fruit, either before, during, or after the meal, until she feels uncomfortably full. She should not give her attention to her morning duties or occupations until she has gone to the closet to make at least an attempt at having a passage. Abdominal massage and faradization are valuable aids if thoroughly given by an experienced attendant (par. 5 and 7).

16. *Nervous sedatives* can not always be dispensed with. Two teaspoonfuls of the elixir of valerianate of ammonia, or eight grains (0.50 gm.) of asafetida, are to be preferred for mental irritability. Fifteen grains (1 gm.) of ammonium bromide, or a grain (0.06 gm.) of extract of conium with five grains (0.33 gm.) of camphor in a capsule may be given three or four times daily for a few days in hysterical states. Massage, out-door exercise, general faradization, and a regulated diet should at the same time be employed. Massage or gentle faradization given at bedtime may often be made to relieve sleeplessness.

Milder ones preferable.

Massage and faradization.

The coal-tar preparations often give prompt relief in cases of headache due to cerebral hyperemia. One or two moderate doses, such as ten grains (0.66 gm.) of phenacetin, two hours apart, may be given. A full dose of chloral hydrate at bedtime for one or two nights will sometimes break up an attack of sleeplessness.

Phenacetin.

Chloral.

It should be remembered that the stronger sedatives are debilitating, and that their use rapidly develops a desire for them. Hence they should be used sparingly, and without acquainting the patient with the name of the one used. Morphin deranges the secretions, and should be reserved for pain due to organic disease or conditions connected with loose bowels.

CHAPTER VI.

AFTERTREATMENT OF OPERATIONS.

1. **Minor Operations.** All clothes soiled during the Clothes. operation should be changed, and the patient put in bed and warmed with hot-water bottles or bags placed near her, but Hot bottles. never against the skin for fear of blistering it. She should urinate or be catheterized every six or eight hours. This is Urine. to be followed immediately by a plain sterilized vaginal douche Douches. if there be sutures in the cervix or vagina, or by irrigation of the perineum if there be only external sutures. A one per cent. carbolic, or 1 : 4000 corrosive mercuric chlorid, douche is given every eight or twelve hours during the first two or three weeks. Silk sutures are removed in six or seven days, Sutures. silkworm-gut any time after two weeks.

If gauze has been left in the vagina, the douches should not be given until that has been removed (from twenty-four to thirty-six hours). Each time the patient urinates or is catheterized, three inches (eight cm.) of gauze should be pulled out of the vagina and be cut off. Gauze should be applied to the perineum, and changed about every four hours. Powders and oily substances should not be used on the perineum after plastic operations. They hold the secretions, and can not be readily washed off, and therefore become septic agents.

When the traumatism has been great, or when there is danger of hemorrhage, an ice-bag, made by gathering together the edges of a piece of oiled silk and tying them with the gathered edges on top, should be kept on the abdomen for thirty-six hours.

2. Light diet may be allowed as soon as the nausea of the Light diet. anesthetic has passed off, except after suture of the lacerated sphincter ani, when food of a fluid character should be given Liquid. for three or four days.

The bowels are moved on the third day; after perineorrhaphy for complete laceration, on the second day; and each Laxatives. day thereafter.

The nausea, if accompanied by a sour breath, is benefited by eight grains (0.50 gm.) of sodium bicarbonate, in one ounce (30 c.c.) of water every hour or two, and perfect quiet. In extreme cases 30 grains (two gm.) of chloral hydrate in four ounces (120 c.c.) of water by rectum, and repeated if necessary in two hours, affords relief. Nausea continuing after the influence of the anesthetic has passed off, or after the second day, is often relieved by 15 grains (one gm.) of bismuth subnitrate every four hours.

Position.

3. **Abdominal Sections.** The patient is put to bed as directed in paragraph 1; if a drainage-tube has been used, or if there is reason to fear hemorrhage, she is kept on the back. Otherwise the nurse may turn her on the side and change her position every two or three hours if she desires it. The patient should not turn herself nor toss in bed. She should have a pillow under her knees while on the back.

Fluids.

Nausea may be treated as for minor operations (par. 2). If there be danger of hemorrhage from raw surfaces, it is better to withhold fluids for ten or twelve hours. Otherwise a tablespoonful of hot water, or of equal parts of ginger ale and cold water, or of carbonated water, may be allowed every fifteen or twenty minutes. After flatus passes per rectum cold water may be allowed *ad libitum.*

Colonic injections.

Stimulation.

4. If there be much *shock*, or *anemia* from loss of blood, a pint (500 c.c.) of normal saline solution with two ounces (60 c.c.) of whisky should be injected into the colon through a long rectal tube before the patient is taken from the operating table, and repeated every hour or two if necessary. A teaspoonful of brandy, with eight or ten of water, may also be given every hour by mouth if retained.

Stronger stimulation.

For *extreme shock* occasional whiffs of ether, and hypodermics of brandy or nitroglycerin, may be used. Ten minims (one c.c.) of tincture of digitalis with 1 : 30 gr. (0.0022 gm.) of strychnia may be given hypodermically, and be repeated if necessary every half hour for three or four times, then every three or four hours until the pulse remains below 120 for twenty-four hours. Injections of a pint (500 c.c.) of the whisky and salt solution mentioned above may be injected under the skin of the back by means of a long aspirating needle attached to the tube of a fountain syringe. The fluid is pushed beyond the needle by finger-strokes, and the position of the point is changed from time to time without withdrawing it entirely. Twice this quantity of the salt solution, with the same amount of whisky, can be transfused into a vein if one can be found, or into the femoral artery, through a fine needle.

Subcutaneous saline transfusions.

Venous.

Arterial.

An ice-bag may be required (par. 1) if there be danger of hemorrhage.

Hemorrhage.

5. After operations involving the separation of adhesions and disturbance of the position of the intestines, a free movement of gas or feces through the bowels should be procured during the first twenty-four hours. This insures a readjustment of the intestinal coils, and removes the danger of the occurrence of intestinal paralysis or ileus if adhesions form again. As soon as the stomach will retain it, a large dose, or several small doses, of calomel or of a saline or vegetable cathartic is given, followed in three or four hours by an enema of equal parts of water, glycerin, and sulphate of magnesia (Watkins), or by a pint (500 c.c.) of a two per cent. solution of inspissated oxgall in plain water, or a few ounces of the fresh oxgall. If this does not move the bowels freely, or start the passage of gas, the cathartic and the enema are repeated every two hours until the effect is produced. Unless the intestinal canal has been opened during the operation, an opiate should *never* be given until the bowels have been moved, or flatus freely passed, after which it will seldom be wanted. A mild laxative should be taken every second day, and be followed in a few hours by a plain or soapsuds enema. Painful accumulations of gas are usually relieved by an enema of one part glycerin and two of water.

Early catharsis.

Danger.

Method.

Enemas.

Flatus.

Opiate.

Every second day.

In all cases in which I expect to find adhesions, I give a large dose of cascara or senna two hours before the time to give the anesthetic, in order to stimulate the intestines to peristaltic action soon after the operation, and have found it a valuable aid in procuring a passage of rectal flatus as well as in promoting the comfort of the patient.

A slight depression of temperature immediately after an abdominal section is the rule, and is usually relieved by the hot bottles or bags. A rise of temperature not exceeding 104° F. (40° C.) need not cause alarm, as it may be expected to subside within a few hours or days, according to the amount of traumatism. A rise of temperature after the first few days usually denotes a development of sepsis, and may require a secondary abdominal section, if it steadily increases and the pulse becomes rapid. If a considerable rise takes place after the removal of a drainage-tube, the place where the tube was should be opened with a probe, or the tube should be re-introduced.

Ileus that does not yield to brisk cathartic and stimulating enemas should be relieved by abdominal section before the pulse has become weak and thready. The operation should, as a rule, be confined to opening the wound, separating the adhesions with the fingers, and the introduction of a glass drainage-tube. Extensive manipulations among the intestines, at secondary abdominal sections, flushings, etc., are apt to cause a fatal shock, or a spread of the septic matter. A large dose of calomel, or of salts, should follow, and stimulating enemas be frequently repeated until gas passes freely per rectum, or until the bowels move.

When the bladder has been opened during the operation, a self-retaining catheter should be kept in the urethra, or the urine be drawn every three or four hours for the first four days. The drinks should be limited to the necessity of the patient, in order to prevent a large flow of urine.

When the intestines have been cut or lacerated and sutured, the bowels should be kept quiet by three or four small doses of morphin each twenty-four hours for four days, and then be moved by repeated moderate doses of salines and enemas. If the injury has been in the colon or sigmoid flexure, the enema should be a small one, such as an ounce (30 gm.) each of salts, glycerin, and water. It is well to forcibly dilate the sphincter ani in such cases before the patient comes from under the influence of ether.

For the management of drainage see chapter IV, paragraph 2.

First day. 6. No *nourishment* is given during the first twenty-four hours, unless it be found desirable on account of the exhausted condition of the patient to inject a pint (500 c.c.) of beef tea, containing a half of one per cent. of salt and a dose of brandy, into the colon. During the second day, if the nausea has subsided, two tablespoonfuls of barley-water, or gruel, or matzoon (buttermilk), animal broth, or peptonized milk or koumiss may be given every two hours. On the third day the quantity may be doubled. On the fourth or fifth day, milk-toast, chip-toast, or crackers, are allowed at meal times. After that a light diet.

Second day.

Third day

Fourth and fifth.

The ordinary second week's diet is as follows: For breakfast, broiled or roast steak or mutton, or a soft egg, with a fruit relish (baked apple, apple sauce, orange, or juice from canned fruit), and toast or cracker, or stale bread lightly buttered. Same for noon dinner. Small dish of rice, cornstarch, or other cereal, or cottage cheese, with fruit relish and toast or cracker for supper. A glass of milk or koumiss, or a cup of thin gruel, with each meal, between each meal, at bedtime, and upon awakening in the morning.

When the stomach will not retain food for several days, colonic enemas may be used every four or six hours, of a pint (500 c.c.) of equal parts of peptonized milk and a one per cent. solution of table salt with the beaten whites of two eggs. Before each enema is used, the residuum of the previous enema should be washed out with plain water.

During the third week broiled, baked, or roasted beef, lamb, fish, or fowl, and soft eggs are allowed morning and noon, also potatoes or light vegetables once daily, and fresh fruit without seeds. After that regular diet.

7. The patient should remain in bed for three weeks. During the third week, in uncomplicated cases, she may be propped up for her meals. After the third week she sits up and moves about more and more each day, and by the fourth week can walk about according to her feelings.

Time in bed.

Getting up.

Ordinary duties, such as housework, shopping, etc., should not be resumed until six weeks, or later if the operation has been for inflammatory conditions.

Ordinary duties.

Adhesive straps extending across the abdomen, or a snug abdominal bandage held in place by a perineal band, should be worn for four months.

Bandage.

Daily sponge baths of alcohol or warm water should be

Baths.

given after the first three days. After the third or fourth week, according to her condition, the patient may get into the bath-tub.

8. **Vaginal Section.** The general aftertreatment is similar to that of abdominal section. There is seldom as much shock and reaction. No abdominal bandage is used.

Less shock.

If the peritoneal cavity has not been completely shut off, the patient should remain on her back for forty-eight hours, in order that the oozing fluids may gravitate to the vaginal opening.

Position.

The gauze packing should be removed, in sections of about a foot (30 cm.) every four hours, at the end of the fourth or on the fifth day; a plain sterilized douche should be given about eight hours after it is all out, and a one per cent. carbolic douche every eight or twelve hours until the vaginal wound is completely healed.

Packing.

Douches.

The patient may sit up out of bed during the third week in simple cases.

Out of bed.

When the patient urinates the protruding gauze is pushed into the vagina, and cotton, smeared with vaselin, temporarily put in the vaginal entrance. The end of the gauze should ordinarily protrude at the vulva and be in contact with a pad of sterilized gauze or cotton, which is changed every four hours. It is well to cut off about two inches (five cm.) after each passage of urine.

PART TWO.

ANATOMY.

CHAPTER I.

THE VULVA AND VAGINA.

1. The **vulva** includes the parts known as the Labia Majora, the Mons Veneris, the Posterior Commissure or Fourchette, the Labia Minora, the Clitoris, the Vestibule, the Fossa Navicularis, and the Vulvovaginal Glands.

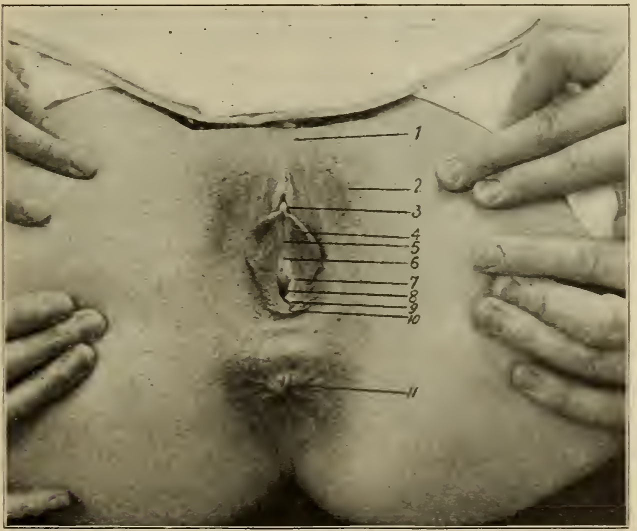


FIG. 48.—THE VULVA, WITH LABIA SEPARATED. (*From photograph.*)
1. Mons veneris. 2. Labium majus, drawn aside. 3. Clitoris. 4. Labium minus, slightly larger than the average. 5. Vestibule. 6. Urethra. 7. Duct of vulvovaginal gland. 8. Vaginal entrance. 9. Remains of hymen. 10. Fourchette. 11. Anus.

2. The **labia majora** are two folds of skin—one on either side of the genital cleft—that normally lie in apposition and conceal the underlying genital organs and vaginal outlet. They are covered with hair on their external surface. Under the subcutaneous fatty tissue lies the pudendal sac (dartos), which contains a little fatty tissue, and receives a few fibers of the round ligament into its neck at the inguinal ring. Anteriorly the labia join upon the symphysis pubes, forming the mons veneris; posteriorly, they join to form the posterior commissure, or fourchette.

3. The **labia minora** are small, elevated folds of membrane, resembling somewhat a cock's comb, which extend on either side down the pubic rami just within the labia majora. They are variable in size, and may project between the labia majora, but are usually covered by the latter. Anteriorly, each of the labia minora divides into two folds before they meet in the median line, the anterior division passing over the glans clitoris to form the prepuce, the posterior under it to form the frenulum or suspensory ligament. Posteriorly, the labia may meet to form a frenulum just anterior to the posterior commissure, but more often they lose themselves in the labia majora. The surface, like that of the inner surface of the labia majora, contains sebaceous glands, but no hair follicles. They are covered with stratified squamous epithelium, the lower layers being pigmented, the upper ones hardened and without nuclei.

4. The **clitoris** is an erectile body analagous to the penis, and consists of two crura which arise on the rami of the pubes and ischia on either side, and unite to form the body of the clitoris, which is joined to the gland by the pars intermedia of the corpora cavernosa. The clitoris is covered by connective tissue, the glans being the only part visible.

5. The **vestibule** is the space bounded externally by the labia minora and clitoris, and internally by the vaginal entrance or hymen. Numerous acinous glands are scattered over its

surface. The epithelium is similar to that of the vagina (par. 8).

6. The **fossa navicularis** is the posterior portion of the vestibule. It is a boat-shaped space extending across the median line between the hymen and posterior commissure, and is rendered apparent when the latter is drawn away from the hymen.

7. The **vulvovaginal glands** (Bartholin's glands) lie behind the deep layers of the perineal fascia under the posterior third of the labia majora, one on either side. They are of the compound racemose variety, about the size of a small almond, and open through a long duct in the vestibule in front of the middle third of the hymen. Their function is to lubricate the vaginal entrance during coitus.

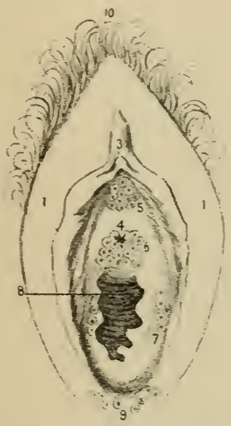


FIG. 49.—GLANDS OF THE VESTIBULE AND FOSSA NAVICULARIS. (*Savage*).

1, 1. Labia majora. 3. Clitoris. 4. Urinary meatus. 5, 6, 7, 9. Collocation of vulvar glands. 8. Vaginal aperture and hymen. 10. Mons veneris.

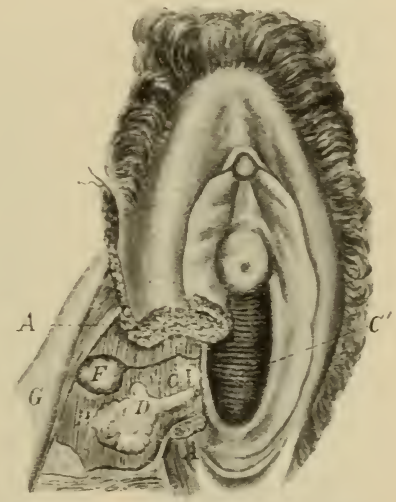


FIG. 50.—VULVOVAGINAL GLAND. (*Huguier*.) *A*, *A*. Section of labia. *B*. Gland. *C*. Duct. *C″*. Stilette introduced. *D* Glandular end of duct. *E*. Free end of duct. *F*. Section of bulb. *G*. Ascending ramus of ischium.

The vulva is supplied with blood by the *pudic artery*, which runs forward along the ischiopubic rami between the aponeuroses of the perineal septum. The following branches are given off: *inferior hemorrhoidal*, *transverse perineal*, *superficial perineal* or *vulval*, *artery of the bulb*, *profunda branch* to the crus clitoridis, *dorsal artery* of the clitoris (Savage).

The *veins* communicate with the pudic, obturator, and the hemorrhoidal veins, as well as with those of the abdominal walls.

The *pudic nerve*, which is in close relation with the pudic artery, supplies the vulva and perineum with nerves.

The lymphatic vessels communicate with those of the surrounding skin and the vagina, and lead to the inguinal glands.

8. The **vagina** is a canal leading from the vulva through the pelvic connective tissue to the cervix uteri. It runs backward at an angle of about 45° with the horizon, and has firm connective-tissue attachments laterally. Its anterior and posterior walls lie in apposition when collapsed, making of it a transverse slit with lateral folds that present an H shape in section. (Fig. 51, Va.) Inferiorly it begins at the hymen, passes upward a few centimeters over the levator ani muscle, then backward and upward, and finally, at its upper end, surrounds and attaches itself to the cervix.

9. The **vaginal walls** are composed of an outer loose connective-tissue layer of fibers, a middle muscular layer, and an inner mucous membrane.

The *anterior wall*, which is in relation with the urethra and bladder, is 2½ to 3 inches (six to eight cm.) long, and almost straight. The contractibility of the fibers throws the lining membrane near the orifice into transverse folds, or rugæ, that may project as a single or double column of rugæ.

The *posterior wall* is about ten centimeters (3½ inches) long, and is S-shaped. It is in relation below with the levator perinei muscles, in its median portion with the rectum, and in its upper end with the peritoneum of the culdesac of Douglas. Rugæ similar to those on the anterior wall are formed near the hymen.

The mucous membrane is composed of connective tissue (into which a few muscular fibers project), which forms papillæ covered by stratified epithelium. The deeper layers of the epithelium are cylindrical, with elongated nuclei, while the superficial ones are squamous. A few glands or follicles are found at the upper end.

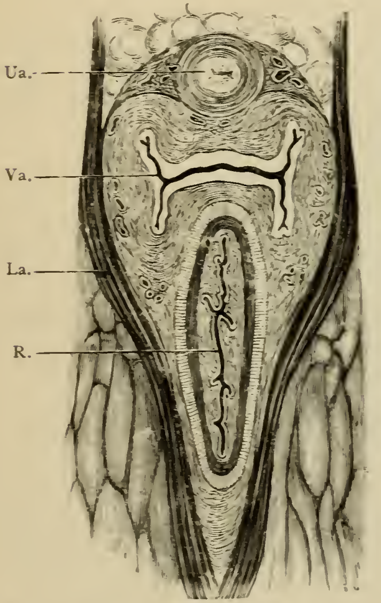


Fig. 51.—Horizontal Section of Pelvic Floor Near Pelvic Outlet, Showing Vaginal and Rectal Slits. (*Henle.*)
Ua. Urethra. Va Vagina. R. Rectum. La. Levator ani.

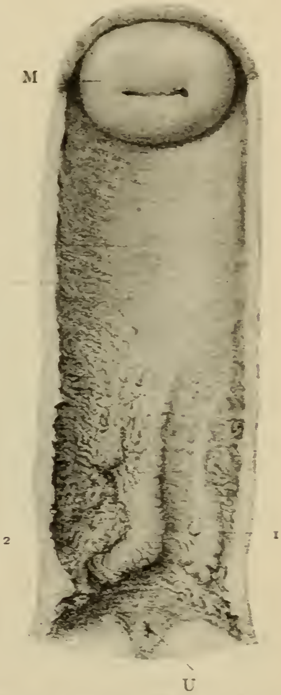


Fig. 52.—Anterior Wall of Vagina Showing Columnæ Rugarum. (*Savage.*)
1, 2. Anterior columns of the vagina. U. Urethral orifice. M. Cervix.

10. The **hymen** is a fold of mucous membrane—containing a few connective-tissue fibers, blood-vessels, and nervous fila-

ments—that is stretched between the vagina and vulva, and marks the vaginal entrance (Figs. 48 and 49). It has, as a rule, the appearance of a membrane perforated in the center, but may be crescentic in shape, with the opening under the urethra ; or it may have a perforation on either side of the center, or may have several perforations (cribriform). (Fig. 108.) During coitus it is torn or overstretched, and remains relaxed ; during labor it is destroyed, and the remaining shreds are called the carunculæ myrtiformis.

11. The vagina is supplied with blood by the vaginal arteries, which are, as a rule, given off from the uterine arteries. They run forward on either side of the posterior vaginal wall. The smallest branches form loops in the papillæ.

The veins gather the blood from the papillæ into a submucous plexus, then pass through the walls forming the vaginal plexus in front, communicating with the veins of the bulb and the vaginal plexus behind, and with those of the labia. The venous trunks rising from these plexuses follow the course of the vaginal arteries and terminate in the hemorrhoidal plexus.

The nervous supply is mainly from the hypogastric plexus.

The lymphatic vessels of the lower end of the vagina communicate with those of the vulva, and pass to the inguinal glands. Those of the middle portion pass to the iliac plexus beside the rectum. Those of the upper end unite with those of the cervix.

CHAPTER II.

THE PERINEUM AND PELVIC FLOOR.

1. The female perineum occupies the space between the rami of the pubes and ischia and the tip of the coccyx, and is covered by the vulva and surrounding skin. The triangular

ligament is, in the female, called the perineal septum. It consists of two layers of fascia inclosing a thin layer of muscular fibers that form, at its lower edge, the internal *transversus perinei*, and is perforated above for the passage of the vagina and urethra. Upon the outer surface of this, and inclosed in the *external perineal fascia*, are the *erector clitoridis*, the *constrictor cunni* or vulval sphincter, the external *transversus perinei*, and *sphincter ani* muscles. About an inch (three cm.) above the sphincter ani, the descending rectum turns backward over the edge of the levator ani muscles toward the anus, and thus passes under the lower edge of the perineal septum (Figs. 56 and 150).

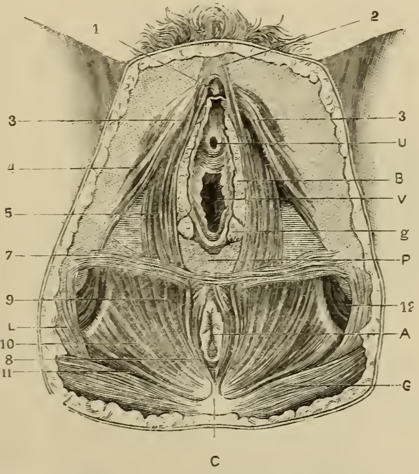


FIG. 53.—DISSECTION OF THE MUSCLES OF THE PERINEUM AND PELVIC FLOOR. (*Savage.*)
A. Anus. B. Bulb of the vagina. C. Coccyx. L. Larger sacrosciatic ligament. P. Perineal body. U. Urethra. V. Vagina. G. Gluteus muscle. g. Vulvovaginal gland. 1. Clitoris. 2. Its suspensory ligament. 3. Crura clitoridis. 4. Erector clitoridis muscle. 5. Constrictor cunni. 7. Transversus perinei. 8. Sphincter ani ext. 9, 10. Levator ani. 11. Coccygeus. 12. Obturator ext.

The mass of tissues between the rectum, vagina, and skin is called the perineal body. The triangle formed by a median section of the perineal body is called the perineal triangle

(Fig. 54). The vulvovaginal side of the triangle is about $\frac{4}{5}$ of an inch (two cm.) long, the cutaneous side $1\frac{1}{2}$ inches (four cm.), and the rectal side $1\frac{4}{5}$ inches (five cm.) long.

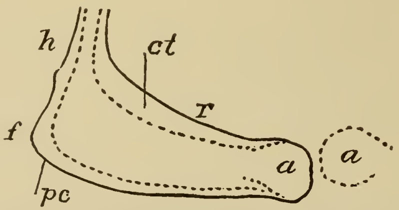


Fig. 54.—Perineal Triangle of Virgin, Life-size. (Schematic.) *r.* Rectal side. *ct.* Connective tissue. *h.* Hymen. *f.* Fourchette. *pc.* Posterior commissure. *aa.* Sphincter ani. The dotted lines indicate the fascial covering.

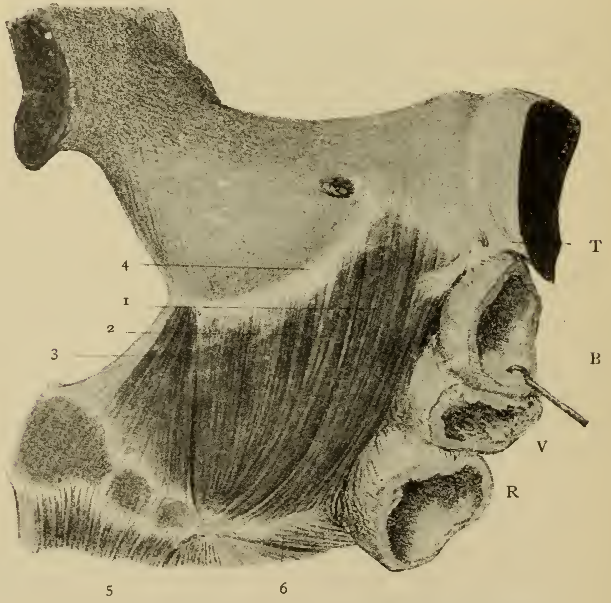


Fig. 55.—Levator Ani and Coccygeus Muscles. (*Savage.*)
1 and 2. Levator ani. 3. Coccygeus (ischiococcygeus) 4. White line or junction of the obturator and rectovesical fasciæ. 5. Coccyx. 6. Coccygeo-anal ligament. T. Subpubic ligament. B. Bladder. V. Vagina. R. Rectum.

2. On the posterior surface of the pubes near the subpubic

ligament, on either side, arise two small bundles of muscular fibers, which pass downward around the lower end of the vagina and meet under it at the rectovaginal angle of the perineal triangle. They constitute the anterior edge of the levator ani, and are called the *levator vaginæ* muscles.

The *levator ani* forms a continuous ribbon of muscle, arising on the posterior surface of the pubic bone, from the levator-vagina to the white line (or dividing of the pelvic fascia into the obturator and rectovesical on the obturator muscle), and along the white line to the ischial spine. The levatores ani extend down from either side to the rectal walls, and most of the fibers meet under the rectum at the coccygeo-anal ligament and at the lower part of the coccyx.

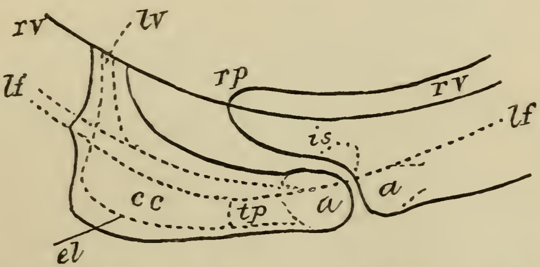


FIG. 56.—RELATIONS OF MUSCLES AND FASCIÆ TO THE PERINEAL TRIANGLE. (Schematic.) *cc.* Attachment of constrictors cunni or vulvar sphincter. *tp.* Attachment of external transversus perinei. *rp.* Rectal promontory, or pelvic floor edge. *lv.* Attachment of levator vagina or vaginal sphincter. *lf, lf.* Levator fascia and posterior layer of perineal septum. *el.* External perineal fascia. *rv, rv.* Rectovesical fascia. *a, a.* Sphincter ani. *is.* Internal sphincter ani.

The *coccygeus* muscle forms the continuation posteriorly of the levator ani. It arises from the spine of the ischium and spreads out fan-shaped over the lesser sacrosciatic ligament, to be attached to the upper end of the coccyx and lower end of the sacrum.

The internal or upper surface of these muscles is covered by the rectovesical fascia, the external or under surface by the levator fascia.

The *function* of the perineum is to afford a firm support to the pelvic organs and tissues, and allows of the passage of the fetus during labor. The perineal body supports the tissues about the pelvic outlet, and closes it adequately without interfering with the discharges.

CHAPTER III.

THE UTERUS.

1. The **uterus** is a hollow muscle lined with mucous membrane. In shape it has been compared to an inverted pear somewhat flattened anteroposteriorly. It is seven cm. (2½ to three inches) long, and is divided into the corpus or body, which is about four cm. (1½ inches) long, and the cervix or neck, which is about three cm. (one inch) long.

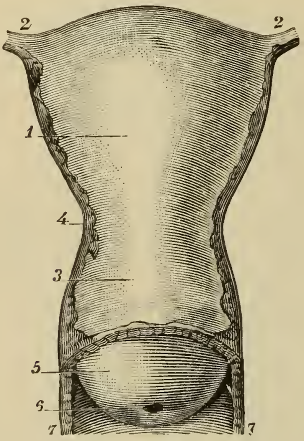


Fig. 57.—Virgin Uterus. (*Sappey.*)
1. Corpus. 2. Cornua. 3 Cervix. 4. Site of os internum. 5. Vaginal portion of cervix. 6. External os. 7. Vagina.

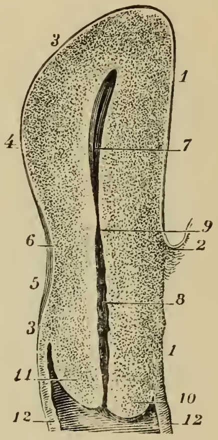


Fig. 58—Virgin Uterus, Median Section. (*Sappey.*)
1. Anterior surface. 2. Vesico-uterine pouch. 3, 4, 5, 6. Posterior surface. 7. Cavity of corpus. 8. Cavity of cervix. 9. Os internum. 10, 11. Vaginal portion of cervix. 12. Vagina.

2. The **cervix** *during infancy* constitutes the larger part of the uterus, and is situated high up in the pelvis upon the posterior surface of the bladder (Figs. 65 and 107). In *adult* life it sinks down to within an inch of the coccyx. It is about eight cm. (2½ to three inches) from the subpubic ligament, its long axis corresponding somewhat to that of the axis of the superior strait. Its long axis lies a little less than a cm. (¼ of an inch) to the left of the median line, and its left side

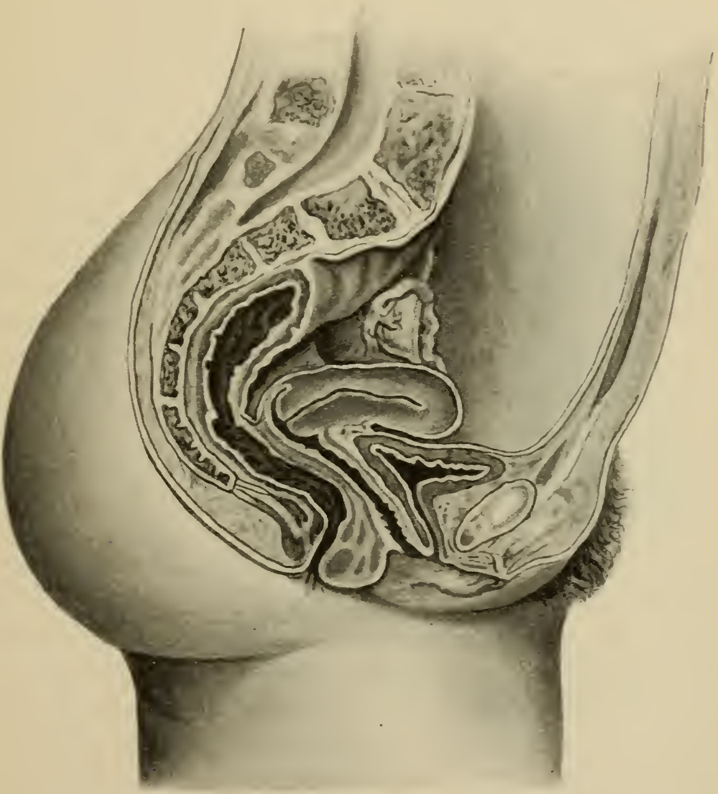


Fig. 59.—Median Section of Pelvis. (*After American Text-book of Obstetrics.*)

is turned a trifle further forward than the right, producing a slight torsion. It changes its position slightly to accommodate itself to the filling and emptying of the bladder and rectum.

It is of the shape of a thick-walled cylinder slightly flattened, and is, in nulliparæ, about three cm. (one inch) wide and not quite so thick. In multiparæ it is normally a trifle larger. The anterior and posterior walls are approximated, producing a broad, flattened cavity, and a slit-like opening, called the external os uteri, into the vagina. When the cervix is poorly developed the os may be represented by a small round opening, the size of a pin's head (Fig. 110). In multiparæ, as a result of lacerations, the os is broader, and may take the shape of a fissure extending across the entire cervix. The upper end of the canal or cavity of the cervix is contracted and round, or almost round.

3. The cervix projects a short distance into the lumen of the vagina at a variable angle, according to the age of the individual or the individual peculiarity of the parts (part 6, chap. II, Figs. 155, 156, and 157). The attachment of the vagina anteriorly is about at the junction of the middle and inferior thirds, the upper two-thirds being in relation with the bladder in front; the attachment of the vagina posteriorly is about at the junction of the upper and middle thirds, the upper third of the cervix being covered with peritoneum posteriorly. Thus the lower third of the cervix is entirely within the vagina, the middle third intravaginal behind and supravaginal in front, while the upper third is entirely supravaginal (Fig. 181). These have been called the vaginal, intermediate, and supravaginal portions (Schroeder).

4. The *cervical walls* are composed of a mixture of muscular and elastic connective-tissue fibers. They are arranged in three layers—an inner and an outer longitudinal layer and a circular one between. The inner layer, particularly that por-

tion near the external os, is firmer, and contains a large number of muscular fibers ; the outer, somewhat thicker, layer is looser in structure, is composed mainly of elastic connective-tissue fibers, and sends fibers into the vaginal walls and surrounding connective tissue (Duehrssen).

5. In children the *mucous membrane* resembles in structure that of the adult. The glands are simpler in form and less numerous, and the epithelium, although cylindrical, is devoid of cilia. The palmæ plicatæ extend into the uterine cavity, and papillæ are found on the surface.

In adults the mucous membrane of the *cervical cavity* is thrown into a series of folds called palmæ plicatæ or arbor vitæ (Fig. 61). These consist of two longitudinal ridges which run along the median line of the anterior and posterior walls respectively, and give off numerous ridges laterally. The connective tissue of the mucous membrane is thick and firm, and separated from the muscular walls by a layer of loose connective tissue. The glands, which are numerous, are of the compound racemose variety, and extend deeply into the connective tissue. The epithelium is cylindrical and ciliated on the edges of the palmæ plicatæ. The nuclei are found in the lower third of the cells.

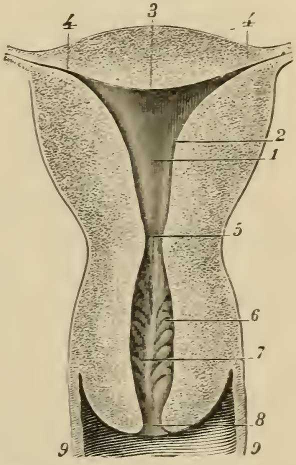


FIG. 60.—TRANSVERSE SECTION OF VIRGIN UTERUS. PALMÆ PLICATÆ OF THE CERVIX. TRIANGULAR SHAPE OF UTERINE CAVITY. (*Sappey.*)

1. Cavity of the corpus. 2. Lateral wall of uterus. 3. Fundus. 4. Cornua. 5. Os internum. 6. Cavity of cervix. 7. Palmæ plicatæ (arbor vitæ). 8. Os externum. 9. Vagina.

The *vaginal portion*, or that part which projects into the vagina, is covered with stratified squamous epithelium growing upon papillæ like that of the vagina, and contains but few glands. The transition from the cylindrical to the stratified squamous

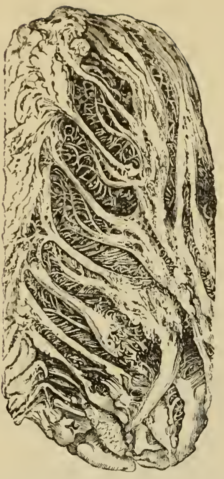


FIG. 61.—ONE OF THE PALMÆ PLICATÆ ENLARGED. (*Courty.*) × 5 diameters.

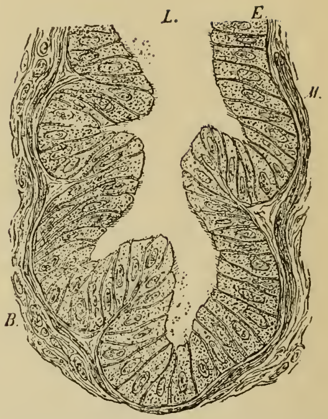


FIG. 62.—CERVICAL GLAND FROM THE UTERUS OF A MULTIPARA. (*Boldt.*) × 400.

B. Connective tissue. *M.* Layer of smooth muscle. *E.* Epithelial cells. *L.* Lumen of the tube.

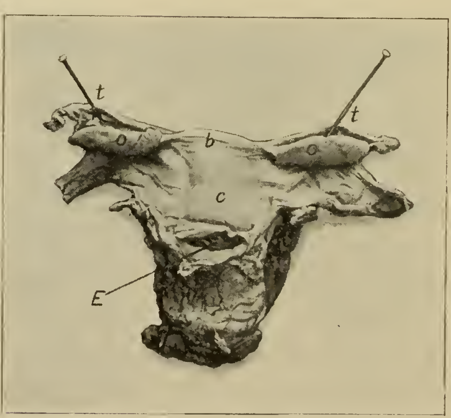


FIG. 63.—FETAL UTERUS AND ADNEXA IN NINTH MONTH. POSTERIOR VIEW. (*Dr. Mergler's Case.*)

b. Fundus uteri. *c.* Cervix. *o.* Ovary. *t.* Tube. E. Rectum. Two fine wires are inserted into the ureters on either side.

epithelium takes place normally at the os uteri, but it varies in different individuals, and at different times in the same individual as the result of abnormal conditions.

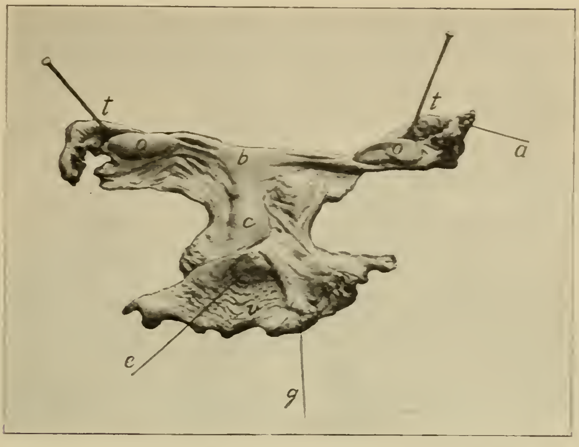


Fig. 64.—Infantile Uterus and Adnexa, from Child Eighteen Months Old. Posterior View. (*Dr. Patrick's Case.*)

b. Body of uterus. *c.* Cervix. *o.* Ovary. *t.* Fallopian tube. *v.* Vagina, showing papillary folds. *e.* External os and vaginal portion of cervix. *g.* Wire passed into vulvovaginal gland. *a.* Wire passed into an accessory ostium tubæ.

6. The body, or **corpus uteri**, in the child is in an undeveloped state, and is but little over half as long as the cervix (Fig. 107). The mucous membrane is similar to that of the adult, but the epithelium is devoid of cilia. At puberty it develops to its full length and reaches almost to the superior strait. It leans over the bladder, forming a gentle curve with the cervix, which varies slightly with the filling and emptying of the bladder (Fig. 59). It is about three cm. (one inch) thick, and as wide as the cervix inferiorly, but it becomes progressively wider toward the top

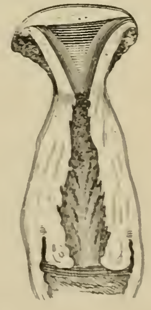


Fig. 65.—Infantile Uterus. Coronal Section. (*Schroeder.*)

or fundus, where it forms two apices or cornua, about five cm. (two inches) apart in multiparæ, but a little less in nulliparæ (Fig. 60). The walls are 1 ½ cm. (½ of an inch) thick, and the cavity is transversely triangular in shape, the angles corresponding to the internal os and the cornua. The anterior and posterior walls lie almost in contact. At the cornua the walls become thinner and merge into those of the Fallopian tubes.

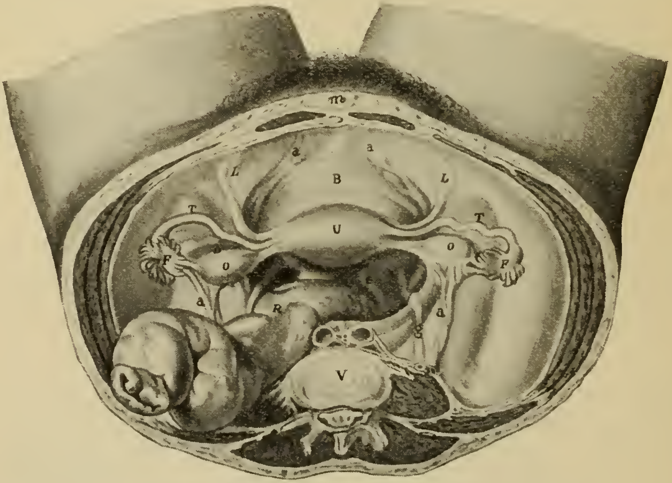


Fig. 66.—View of Pelvic Organs Seen from Above. (*Savage.*)
R. Rectum. O. Ovary. T. Fallopian tube. F. Fimbriæ. L. Round ligament. U. Uterus. B. Bladder. V. Vertebra. m. Pubic fat. b. Broad ligament. g. Ureter.

7. Anteriorly the uterus is in relation with the bladder; posteriorly and superiorly, with the intestines; inferiorly, with the cervix; and laterally, with the broad ligaments, into which it gives off the Fallopian tubes, the round ligament, the ovarian ligament, as well as many scattered muscular fibers.

8. The *walls* are composed of muscular fibers arranged more or less distinctly into three layers. The outer and inner layers are longitudinal, but those near the cornua encircle it and become uniform and continuous with those of

the tube. The middle layer, which contains the blood-vessels, is made up largely of longitudinal fibers, but possesses also a large number of fibers running in all directions.

9. The *mucous membrane* of the uterus is one mm. ($\frac{1}{25}$ of an inch) thick, soft in consistence, and of a reddish-gray color. It is lined with a single layer of ciliated cylindrical epithelium placed upon an imperfectly formed basement membrane, which is readily penetrated by the underlying cells. The utricular glands, which are numerous and branched, are of the tubular variety, and extend into the tissues almost perpendicular to the surface. They are composed of cylindrical epithelial cells without cilia and without any appreciable basement membrane, hence these cells may be considered in direct contact with the surrounding lymphatics, blood-vessels, and intercellular amorphous substance. The nuclei are centrally located.

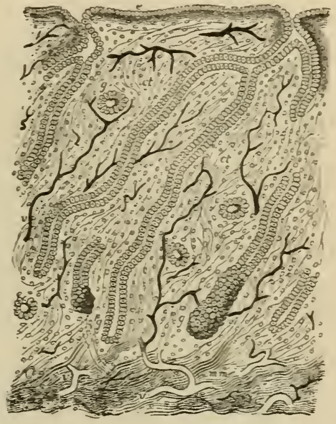


Fig. 67.—Vertical Section through the Mucous Membrane of the Uterus (*Ruge.*)

g, g. Utricular glands. ct. Interglandular connective tissue. v. Blood-vessels. mm. Muscularis mucosæ. e. Cylindrical epithelium (450 x I).

10. The **blood supply** of the uterus comes from the uterine and spermatic arteries. The uterine artery is given off from the internal iliac artery, and keeps close to the ureter until it reaches the cervix near the internal os uteri, then turns abruptly upward and passes along the lateral edge of the uterus to the ovarian ligament. Here it gives off a branch to the tube and terminates in the spermatic artery. It also gives off a vesical branch, a circular cervical branch, and numerous small branches to the uterus. The epigastric artery arises from the aorta

about six cm. (two inches) above its bifurcation; occasionally from the renal. It passes downward behind the peritoneum, crosses the ureter and iliac vessels, enters the suspensory ligament of the ovary, and proceeds through it and under the ovary to meet the uterine artery at the origin of the ovarian ligament. The uterine veins following the course of the arteries empty in the hypogastric and pampiniform plexus.

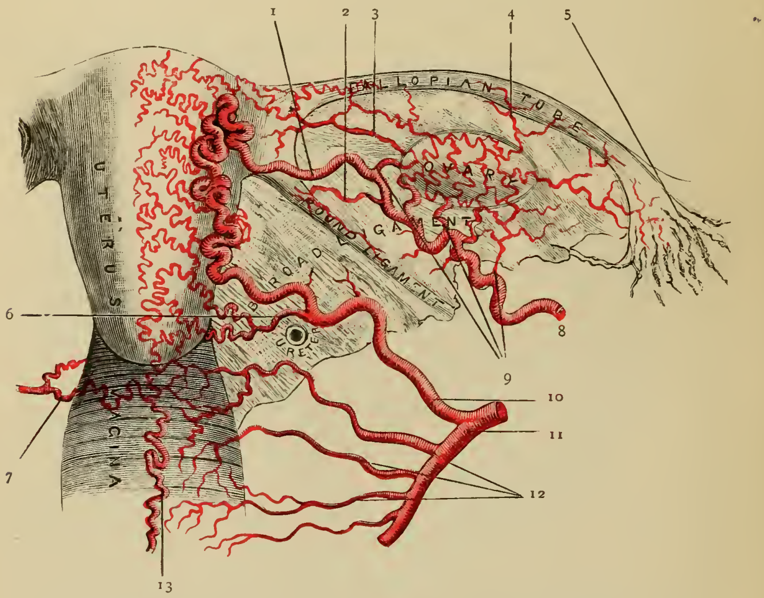


FIG. 68.—SCHEME OF THE OVARIAN AND UTERINE AND VAGINAL ARTERIES. (*From Morris' Anatomy.*)

1. Uterine branch of spermatic artery. 2. Branch to round ligament. 3. Branches to isthmus. 4. Branch to ampulla. 5. Fimbriated extremity of Fallopian tube. 6. Cervical branch of uterine artery. 7. Coronal artery. 8. Spermatic artery. 9. Ovarian branches. 10. Uterine artery. 11. Internal iliac artery. 12. Vaginal arteries. 13. Azygos artery of vagina.

11. The uterus is abundantly supplied throughout with a capillary network of **lymphatic vessels** which empty into larger branches at the sides of the uterus. Two or three of these extend from the cervix on either side, along the uterine artery and vein, to the sides of the pelvis, and into the lym-

phatic glands at the angle of the external and internal iliac arteries. Two or three other branches pass from the corpus uteri along the spermatic vessels, between the ovarian ligament and tube, and upward to the lumbar glands. Small vessels pass with the round ligament to the inguinal canal.

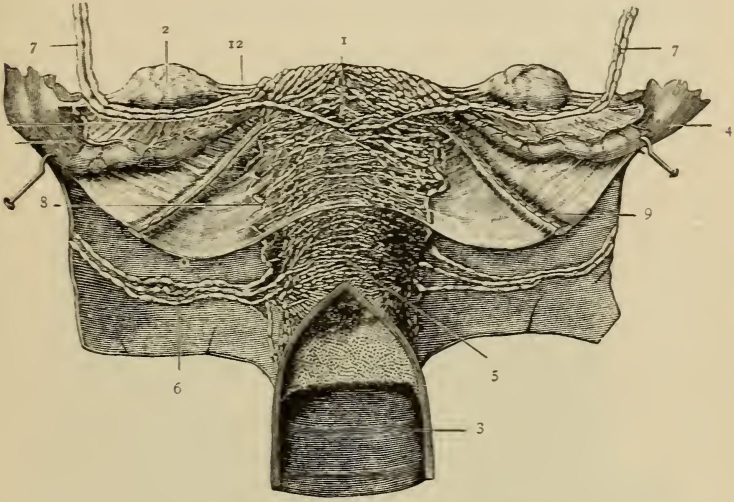


Fig. 69.—Lymphatics of the Uterus. (*Poirier.*)

1. Lymphatics from the body and fundus of the uterus. 2. Ovary. 3. Vagina. 4. Fallopian tube. 5. Lymphatics from the cervix. 6. Lymphatics going from the cervix to the lymphatic ganglia. 7. Lymphatics going from the body and fundus to the lumbar ganglia. 8. Anastomosis of corporeal and cervical vessels. 9. Small lymphatic in round ligament going to the inguinal glands. 10, 11. Lymphatic vessels of the tubes emptying into the large lymphatic vessels from the body of the uterus. 12. Ovarian ligament.

12. The **nerves** of the uterus come principally from the cervical ganglion, which lies between the posterior vaginal vault and the rectum; but it receives a few from the hypogastric plexus. The corpus is more abundantly supplied with nerves than the cervix.

CHAPTER IV.

THE FALLOPIAN TUBES.

1. The **Fallopian tubes** are about ten cm. (four inches) in length, and extend from the uterus outward, curving around the ovary and opening into the peritoneal cavity through the ostium abdominale. They are about as large round as a slate pencil, or two mm. ($\frac{1}{12}$ of an inch), at the uterine end, and gradually increase in size to the abdominal end, where they are nearly three times as large in diameter (six mm., or $\frac{1}{4}$ of an inch). The outer portion is called the ampulla; the inner portion, the isthmus; and the fold of broad ligament by which they are held, the mesosalpinx.

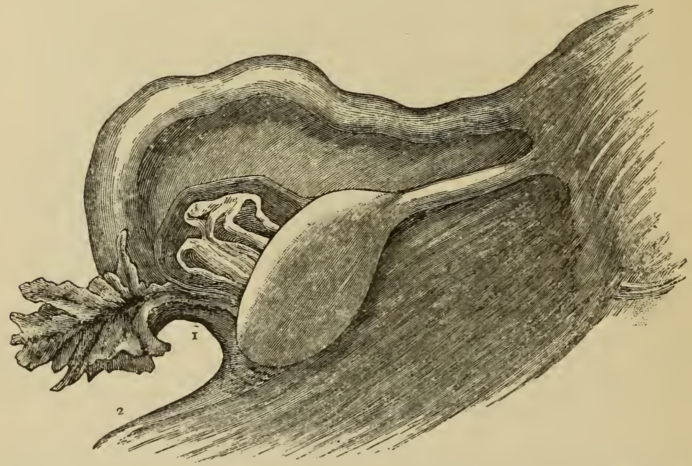


FIG. 70.—FALLOPIAN TUBE AND OVARY, SEEN FROM BEHIND. (*Modified from Henle.*)
1. Infundibulo-ovarian ligament. 2. Suspensory ligament of the ovary.

2. The *walls* of the tube are continuous with the uterine walls, and consist of an external or serous coat, a middle or muscular, and an inner or mucous coat, which projects beyond the ostium abdominale in the shape of fimbriæ. Contraction of

muscular fibers in the fimbriæ and in the contiguous portions of the broad ligament (Rouget) cause motions of the fimbriæ that bring them in contact with the ovary during menstrual congestion. At the uterine end the muscular wall is thick, the lumen small, and the mucous membrane smooth and slightly folded in a longitudinal direction. As the tube increases in size toward the abdominal ostium, the walls become thinner and more vascular, and the longitudinal folds of mucous membrane are more abundant, and complicate by secondary folds. This complicated system of folds, or plicæ, and the recesses formed by them, seem to take the place of glands (Bland, Sutton). The epithelium is of the cylindrical variety, with cilia which wave toward the uterine end, and is supported by embryonic connective tissue. It secretes a thin mucus.

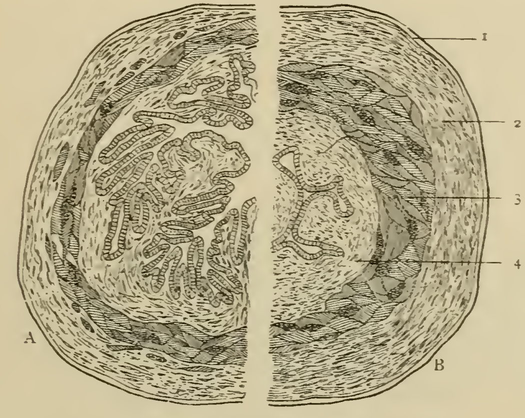


FIG. 71.—NORMAL FALLOPIAN TUBE. (*Wyder.*)

A. Enlarged section from the ampulla, showing the folding of the mucous membrane and thinness of the walls. B. Section from near the uterus, showing small size of the lumen and thickness of the walls. 1. Serous coat. 2. Connective tissue supporting the serous coat. 3. Muscular coat. 4. Connective tissue supporting the epithelium.

The muscular coat is made up mainly of circular unstriped fibers surrounded by a thin layer of longitudinal fibers. Longitudinal and circular fibers may be traced into the folds of the mucous membrane. The serous coat is connected with the muscular by means of loose connective tissue containing oblique interlacing muscular fibers and the blood-vessels, and ends abruptly with the circular layer of muscular fibers at the ostium abdominale.

3. The tube is supplied with *blood* by a branch of the spermatic artery, and at the uterine end by a branch of the uterine. The veins empty in part into the uterine and in part into the spermatic veins.

Lymphatic vessels connect the tubes with the large lymphatic vessels that pass from the uterus to the lumbar ganglia.

The *nerves* are supplied from that portion of the hypogastric plexus that passes up beside the uterus without first entering the cervical ganglion. The fibers terminate under the epithelium.

4. The *course* of the tubes is somewhat tortuous, the more so if they are poorly developed or in a state of subinvolution (Haultain), conditions which favor constrictions of their lumen, and cystic accumulations. Occasionally one or more accessory ostia are found (Fig. 95).

5. The *function* of the tube is to conduct the ovum to the uterus, to serve as a passage of the spermatozoa to the infundibulum, and probably to provide a place for the fecundation of the ovum (A. Martin).

The motion of the fimbriæ, the suction produced by tubal peristalsis, and the movement of the liquor folliculi and peritoneal fluid, are supposed to act in conducting it into the tube, where the motion of the fimbriæ and peristalsis—one or both—pass it on to the uterus. The passage of the ovum through the tube requires about a week (A. Martin). The spermatozoa have been found in the ovum at the fimbriated end of the tube of the rabbit thirteen hours after coitus, indicating that they pass through the tube quite rapidly.

During menstruation the tube is congested, and contains a slight excess of mucus, and, under certain abnormal conditions, a small quantity of blood or bloody mucus.

CHAPTER V.

ANATOMY OF THE OVARY.

1. Normal ovaries vary in size even in the same individual. They weigh from 5 to 10 gm. (75 to 150 grains). They are almond-shaped bodies 3 to 5 cm. (1 to 2 inches) in length, 2 to 3 cm. (⅔ to one inch) in width, and about 12 mm. (half an inch) in thickness. They are situated on either side of the uterus, extending from 2.5 cm. (one inch) to one side of the uterine cornua toward the posterior half of the pelvic wall near the pelvic brim. They project from the posterior wall of the broad ligament, and the peritoneal fold thus formed under it is called the mesovarium. The ovarian ligament is from

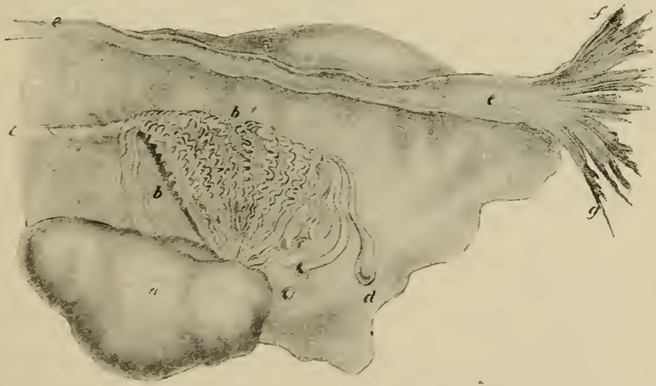


FIG. 72—NORMAL OVARY AND PAROVARIUM. (*Martin's Atlas.*)
a. Ovary. *b*, *b*. Parovarium. *c*. Rudiment of former outlet of Wolffian body. *d*. Cyst-like bulb of same. *e*, *e*. Incised Fallopian tube. (Muller's duct in embryo.) *f*, *f*. Fimbriæ.

2 to 3 cm. (about one inch) long, and connects the ovary with the uterus immediately under the Fallopian tube. The suspensory ligament of the ovary (ligamentum suspensorium ovarii) is in the condensed edge of the broad ligament connecting the ovary and tube with the side wall of the pelvis. The infundibulo-ovarian ligament (ligamentum infundibulo-ovaricum) extends from the infundibulum, or funnel, in which the ampulla ends, to the edge of the broad ligament, and supports the ovarium fimbriæ (Fig. 70).

2. The edge of the ovary which is in relation with the mesovarium, through which the vessels and nerves enter it, is

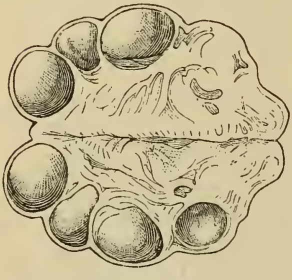


FIG. 73.—SECTION OF OVARY SHOWING PERIPHERAL RIPENED FOLLICLES. (*Sutton.*)

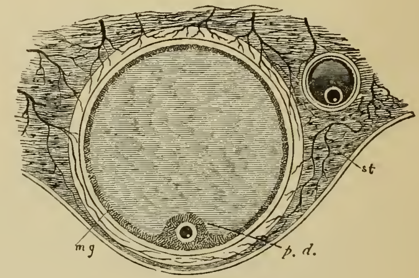


FIG. 74.—TWO GRAAFIAN FOLLICLES. *mg.* Membrana granulosa. *st.* Ovarian stroma. *p. d.* Proligerous disc. (*Davis.*)

called the *hilum*. The portion in relation with or next to the hilum is called the *paraoöphoron*, and is composed of fibrous tissues that contain the vessels, nerves, lymphatics, and a few unstriated muscular fibers. The cortical portion is called the *oöphoron*, and contains the Graafian follicles. It is covered on its free surface by short cylindrical epithelium, instead of peritoneum, which is called the germ epithelium, and under which lies the fibrous covering of the ovary, or the tunica albuginea.

3. The younger or peripheral Graafian follicles or *ovisacs* number many thousands, and are, as a rule, 0.25 mm. (about $\frac{1}{100}$ of an inch), or less, in diameter. The deeper ones are not

so numerous, and are larger, varying up to one mm. ($\frac{1}{24}$ of an inch). The ripening ovisacs are the largest, and, although developed from the deeper ones, are situated near the surface.

The membrana propria, called also the tunica fibrosa of the ovisac, is lined by the membrana granulosa, and contains fluid called the liquor folliculi.

4. The *ovum* is 0.2 mm. (or $\frac{1}{120}$ of an inch) in diameter, and is composed of the vitelline membrane, or zona pellucida, the vitellus, or yelk, the germinal vesicle (0.04 mm., or $\frac{1}{700}$ of an inch, in diameter), which contains the germinal spot (0.01 mm., or $\frac{1}{3000}$ of an inch).

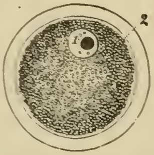


FIG. 75.—HUMAN OVUM.
1. Germinal vesicle.
2. Yelk.

5. *The parovarium* is the remains of the excretory ducts of the Wolffian body (mesonephros), and corresponds to the vasa efferentia and epididymis of the male. It consists of from five to fifteen narrow tubules in the mesosalpinx, extending from the ovary to the ampulla. They may be divided into three parts: (1) Gärtner's duct, running transversely toward the uterus, (2) vertical tubules, extending from the Gärtner's duct to the paraoöphoron, and (3) Kobelt's tubes, which are attached to Gärtner's ducts, but are free at the distal end. They are lined with ciliated cylindrical epithelium.

6. The ovary is supplied with *blood* by six or eight small branches of the spermatic artery. The veins correspond to the artery and form an ovarian plexus in the hilum.

The *lymphatic* vessels surround the follicles and pass in large numbers to the hilum, out along the spermatic vessels and uterine lymphatics, to anastomose with the latter in the lower lumbar region.

The *nerves* come from the spermatic and renal ganglia and the superior mesenteric plexus. The fibers radiate throughout the parenchyma, surround the follicles, and end in the follicular epithelium (v. Gawronsky).

CHAPTER VI.

THE URETHRA, BLADDER, AND URETERS.

1. The **urethra** of the adult woman is from three to five cm. (1 ½ inches) long, and about seven mm. (½ of an inch) in diameter. Its lower end, the meatus, is situated under and against the subpubic ligament, and is somewhat smaller in diameter than the canal itself. It is held in place by the median pubovesical ligament, and passes upward and backward over the anterior vaginal wall to the bladder. In the nullipara its long axis is straight; in the multipara it assumes a slight curve, with concavity facing upward.

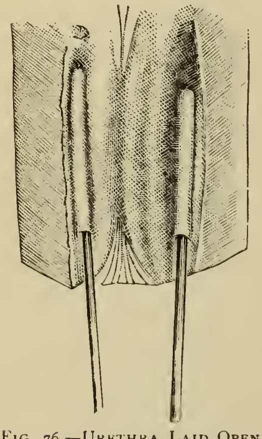


Fig. 76.—Urethra Laid Open with Probes Distending Skene's Glands. Posterior Wall Divided. (*Skene*.)

It has three coats—an outer or connective-tissue coat, a middle or muscular, and an inner or mucous coat. The muscular coat has two layers—an inner layer of longitudinal fibers and an outer one of circular and spiral fibers, which interlace freely.

The mucous membrane rests on a thick network of elastic connective tissue, and is thrown into longitudinal folds when collapsed. Vascular papillæ are distributed everywhere on the surface, and there are quite a number of mucous glands that penetrate the submucous connective tissue. Lacunæ surrounded by villous tufts are found near the meatus.

Two large tubules or glands have been discovered by Skene near the floor of the urethra, one on either side. They open just within the closed meatus, or externally when the meatus is everted, and extend in the mucous coat, parallel with the long axis of the urethra, for one or two cm. ($\frac{3}{8}$ to $\frac{3}{4}$ of an inch). They are large enough to admit a No. 1 sound of the French scale. The upper ends terminate in a number of divisions which branch off in the muscular walls.

The epithelium near the meatus is of the pavement variety, the cells being somewhat smaller than those of the vagina. That of the upper portion is the same as that of the bladder.

The veins of the submucous connective tissue connect with those of the muscular layer through cavernous sinuses, affording a resemblance to the corpus cavernosum of the penis.

2. The **bladder** in woman lies over the anterior vaginal wall, and extends from the pubes to the uterus. It is attached by firm connective tissue to the cervix uteri and vagina, but is separated from the pubes by an abundance of loose fatty connective tissue. Above the cervix and the pubes it is covered with peritoneum, and is in relation with coils of the ileum.

That portion lying between the mouths of the ureters and the internal urethral orifice is called the *trigone* or *trigonum*, and is somewhat firmer than the surrounding walls. This and the bladder walls in front of it as far as the middle of the symphisis (Skene), are called the fundus. The constriction at the urethral entrance is sometimes called the *neck*.

3. The *bladder walls* are composed of three coats. The outer or peritoneal coat covers only the upper portion. In the middle or muscular coat the inner layer of fibers takes in the main a circular direction, while the outer takes a longitudinal, although fibers of both layers interlace quite promiscuously. As the circular and transverse fibers approximate each other and converge at the neck of the bladder, they assume the appearance of a loose sphincter—the *sphincter vesicæ*.

The mucous membrane is united to the muscular coat by a thick layer of elastic connective tissue, containing blood-vessels, nerves, and lymphatics. The epithelium is stratified, the upper layer being small pavement cells ; the second layer cylindrical, with long processes extending down between the third layer, which is also cylindrical, and sends shorter projections up between the cells of the second layer. They rest upon a membrana propria. Racemose glands lined with cylindrical epithelium are found near the neck of the bladder. When the bladder is empty its walls lie collapsed, the upper walls falling against the base. By the contraction of the muscular walls the mucous membrane is thrown into irregular folds. During filling the organ expands laterally under the over-lying body of the uterus, but finally, as it becomes distended, pushes the fundus upward and backward, and assumes a rounded form. In the infantile and senile bladder the vertical diameter is the longest ; in the mature woman the transverse. In woman the anteroposterior diameter is shorter, and the lateral diameter longer, than in man.

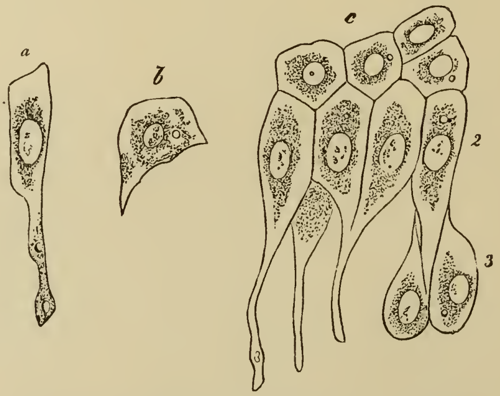


Fig. 77.—Epithelium of the Bladder. (*Obersteiner.*)
a. Cell rom the second layer. *b*. Cell from the superficial layer. *c*. Three layers seen in vertical section. 2. Second layer. 3. Third layer.

4. The *blood supply* is afforded by the vesical branches of the iliac arteries and a vesical branch of the uterine. Venous plexuses are large and abundant about the base and lower

portion of the bladder, and find an outlet in the internal iliac veins. The plexuses about the neck of the bladder and urethra communicate with those of the labia minora, uterus, and rectum.

The bladder is supplied by *nerves* from the third and fourth sacral (spinal) and from the hypogastric (sympathetic) plexus.

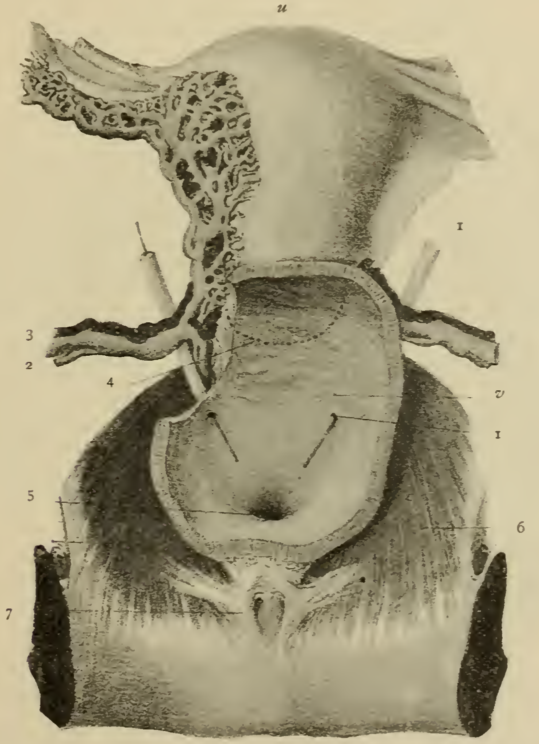


FIG. 78.—BASE OF BLADDER, SHOWING ENTRANCE OF URETERS. (*Savage.*)
v. Bladder. *u*. Uterus. 1. Ureter. 2, 3. Uterine artery and vein. 4 End of cervix. 5. Urethra. 6. Levator ani. 7. Posterior surface of pubes.

5. The **ureters** terminate in the bladder as longitudinal openings at the basal angles of the trigonum about four cm. (1 ½ inches) apart, and two cm. (¾ of an inch) in front of the

cervix. They are the size of a goose-quill, and pass diagonally outward and backward for half an inch through the bladder wall, and then take a more backward direction toward the spine of the ischium on either side, passing through the plexus

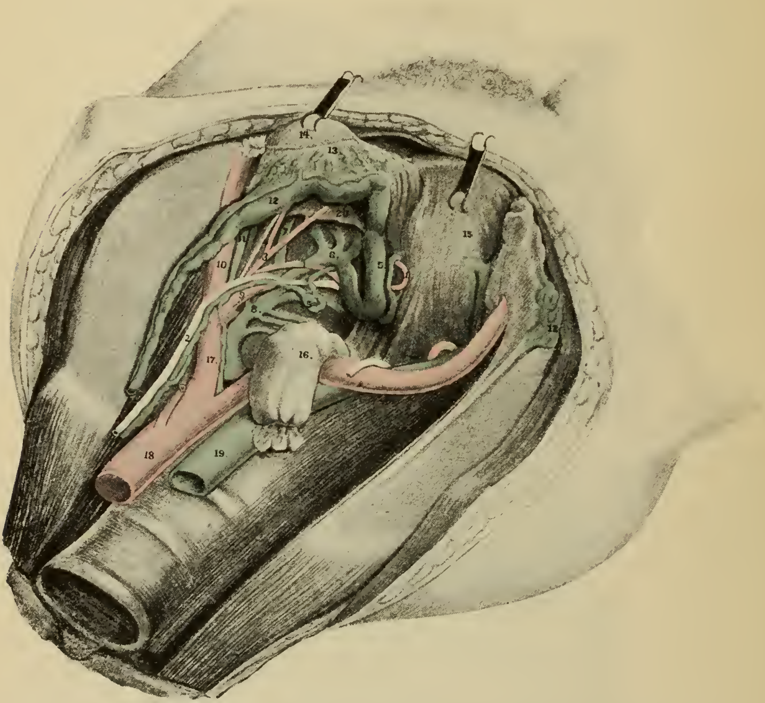


FIG. 79.—DISSECTION OF THE LEFT SIDE OF THE PELVIC CAVITY, SHOWING COURSE OF THE LEFT URETER. SMALL VENOUS RADICALS NOT SHOWN. (*Nagel.*)

1, 1. Uterine artery. 2. Ureter. 3 Umbilical artery. 5. Uterine vein. 6. Vesicovaginal vein. 7. Obturator vein. 8. Hypogastric vein. 9. Hypogastric artery. 10. External iliac artery. 11. External iliac vein. 12, 12. Spermatic vein. 13. Bulb of the ovary. 14. Ovary. 15. Uterus. 16. Rectum. 17. Common iliac artery. 18. Descending artery. 19. Inferior vena cava. 20. Posterior wall of bladder.

of veins beside the cervix and crossing under the uterine artery ½ of a cm. ($\frac{1}{5}$ of an inch) from the edge of the cervix.

The left ureter reaches the pelvic wall at the median side of the internal iliac artery, curves upward beside this artery and behind the rectum, crosses the common iliac 1½ cm. (½ of an inch) above its bifurcation, and proceeds upward over the psoas muscle to the kidney (Fig. 79).

The right ureter again crosses the uterine and also the obturator artery, passes up on their outer side, between the internal iliac artery and vein, crosses the internal iliac vein and the external iliac vein and artery 1½ cm. (½ of an inch) below the bifurcation of the common iliac artery, and ascends, under the termination of the ileum, over the psoas muscle and close to the vena cava, to the pelvis of the kidney.

Longitudinal muscular fibers from the ureters pass across the base of the trigonum to meet those of the opposite side, producing the so-called interureteric ligament (Juerie), which can be felt by vaginal indagation. A muscular bundle of fibers also passes from the neck of the bladder to each ureter.

6. The ureters are retroperitoneal throughout their course. The pelvic portion is about the size of a goose-quill. Toward the pelvis of the kidney it increases in diameter. It has three coats—an external or fibrous, a middle or muscular, consisting of an external circular and an internal longitudinal layer, and an internal or mucous coat. The epithelium, like that of the bladder, is stratified, and has three layers, the upper one consisting of flat polyhedral cells with nuclei, the lower ones of cylindrical cells with projecting processes.

The blood supply comes from branches of the inferior vesical, the internal iliac, the spermatic and the renal arteries. Lymphatics are abundant in the walls of the ureter.

CHAPTER VII.

THE RECTUM.

The rectum in the female is about 24 cm. (nine inches) in length. It enters the pelvis on the left side of the promontory of the sacrum, passes downward and to the right until it reaches the median line at the third sacral vertebra, then follows the hollow of the sacrum to the perineal body, under which it turns backward over the edge of the levator ani to the anus. A transverse muscular fold on the anterior rectal wall, opposite the attachment of the posterior vaginal wall to the cervix, produces a constriction that marks the upper end of the ampulla. Other smaller constrictions are found higher up, and in part on the lateral and posterior walls. Just within the external sphincter is a second band of circular muscular fibers, marking the lower border of the circular fibers of the rectal wall, which is called the internal sphincter ani. The constriction above the ampulla has sometimes been called the third sphincter.

The rectum has the same coats as the colon, but is completely covered by peritoneum only as far as the second sacral vertebra, where the mesentery or mesorectum terminates. From here to the lower end of the sacrum it is covered only on its anterior and lateral surfaces, and is loosely attached to the pelvic fascia posteriorly. Below the sacrum the peritoneal covering is wanting. The reflection of the peritoneum forward on the vaginal vault and posterior wall of the cervix forms the culdesac of Douglas. The mucous membrane is thicker than that of the colon, and of a bright pinkish-red color, and contains numbers of Lieberkühn's follicles. Convoluted glands are found near the anus. The epithelium is cylindrical.

The rectal *circulation* is supplied by the superior hemorrhoidal artery, arising from the inferior mesenteric; the middle hemorrhoidal, arising ordinarily from the internal iliac; and the inferior hemorrhoidal, arising from the pudic. The veins empty both into the portal and general circulation.

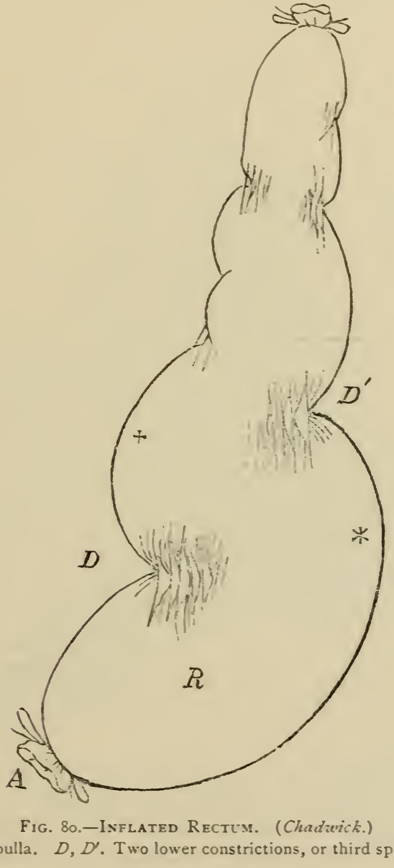


FIG. 80.—INFLATED RECTUM. (*Chadwick.*)
R. Ampulla. *D, D′.* Two lower constrictions, or third sphincter.

The *nerves* are derived mainly from the hypogastric plexus (sympathetic) and from the sacral plexus (spinal).

The *lymphatics* communicate below with those of the skin, and pass through the glands of the mesorectum to the sacral plexus.

CHAPTER VIII.

THE PELVIC CONNECTIVE TISSUE AND PERITONEUM.

1. **Connective tissue** exists in abundance throughout the pelvis. The pelvic organs appear as if originally imbedded in it, and to have developed, or pushed up, or grown up, out of it, carrying the peritoneum up with them and leaving the larger part of the connective tissue under them. It is bordered above by the peritoneum, which is folded about the bladder, uterus, and uterine adnexa, below by the pelvic floor, and on the sides by the pelvic walls. It surrounds the vagina, cervix, lower rectum, and base of the bladder, and extends up along the lateral walls of the uterus. It connects with that of the lumbar region by way of the sacro-uterine ligament and iliac fossæ, with the inguinal region by way of the round ligaments, and with the gluteal regions and thighs along the track of the blood-vessels.

Between the cervix and ureters it is elastic and devoid of fat globules, but contains an abundance of fat near the pelvic walls (Fig. 81).

2. The **peritoneum** is closely attached to the uterus, bladder and rectum, but on account of the abundance of fatty connective tissue is loosely attached to the pelvic brim laterally and anteriorly.

Behind the cervix a fold passes around either side of the rectum, constituting the sacro-uterine ligaments. In front, just above the cervix, the peritoneum is reflected over the bladder to the anterior abdominal wall above the pubes. Beside the uterus the peritoneum is reflected over the Fallopian tube to the sides of the pelvic brim, forming the broad ligaments, and uniting below the tube to form the mesosalpinx (Fig. 70). Just below the tube the ovarian ligament, which is about three cm. (one inch) long, and is composed of fibrous tissue and unstriped muscular fiber, passes to the ovary. The latter projects through the posterior peritoneal fold without taking a covering, but is suspended on the posterior surface of the ligament by a fold from it called the mesovarian. The outer fibrous edge of the broad ligament (the suspensory ligament

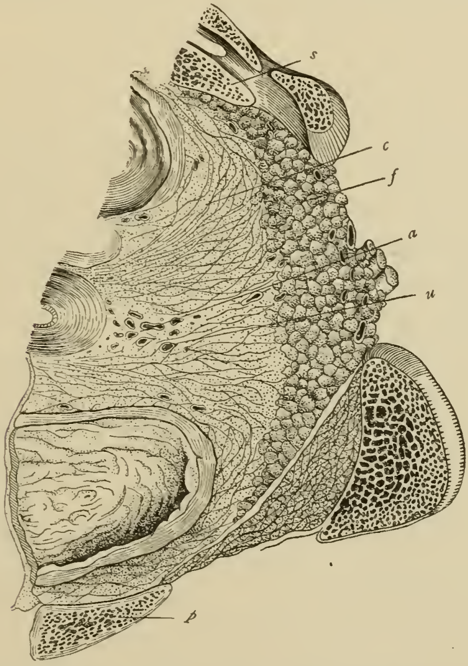


Fig. 81.—Horizontal Section of One-half of the Pelvis through the Second Sacral Vertebra, Showing Pelvic Connective Tissue. (*W. A. Freund.*)

s. Sacrum. *c*. Connective tissue devoid of fat. *f*. Connective tissue containing fat. *a*. Arteries beside cervix. *u*. Ureter. *b*. Bladder. *p*. Pubes.

of the ovary) passes to the pelvic brim just in front of the sacro-iliac synchrondrosis (chap. IV, par. 1).

The anterior peritoneal reflection passes to the iliac fossa. In front of the ovarian ligament, the round ligament, which is a bundle of smooth muscular fibers, passes from the anterior and lateral edge of the uterus, in a curve whose convexity is outward, to the inguinal canal. The peritoneum is reflected closely around it.

Between the round ligaments is the vesical peritoneal space or pouch. External to them, and in front of the broad ligaments, are shallow depressions of peritoneum, and behind the broad ligaments and external to the sacro-uterine ligaments are two deeper peritoneal or sacral hollows, while between the sacro-uterine ligaments the peritoneum dips down a short but variable distance between the rectum and vagina to form the culdesac of Douglas, or recto-uterine pouch.

About the cervix the connective tissue is firm and elastic, the fibers passing from the cervix backward in the direction of the sacro-uterine ligaments, laterally through the broad ligaments, and anteriorly toward the pubes under the bladder.

Below the levator ani, bounded externally by the tuberischii and inferiorly by the subcutaneous fascia, is the ischiorectal fossa, or subcutaneous pelvic connective-tissue space, which contains an abundance of fat.

PART THREE.

DEVELOPMENT AND ANOMALIES OF DEVELOPMENT.

CHAPTER I.

DEVELOPMENT.

1. **The Wolffian Body and Müller's Ducts.** The genital organs are developed from the two longitudinal urogenital ridges which project, one on each side of the body, upon the dorsal wall into the peritoneal cavity. At the lower end of the abdomen the two ridges draw closer together, and finally come into contact with the anal region of the intestinal canal. The ridge is constituted chiefly of the Wolffian body, and it therefore contains the Wolffian tubules and the Wolffian duct. Close alongside the Wolffian duct lies Müller's duct. The essential difference between the two sexes is the change of the genital ridge into an ovary or testis. In the male the Wolffian duct becomes the genital duct, and Müller's duct remains rudimentary. In the female the Müller's duct becomes the genital duct, from which the Fallopian tube, uterus, and vagina are developed, and the Wolffian duct remains rudimentary, and persists in the genital cord as the duct of Gärtner and the parovarium. Müller's ducts unite within the genital cord into a single median duct to form the uterus and vagina; the upper or cephalic portions remain separate and form the Fallopian tubes (Minot). The Wolffian bodies appear in the embryo about the third or fourth week.

Urogenital ridges.

Anal region.

Wolffian tubules and duct.

Müller's duct.

Sexes.

Male.

Female.

Uterus and vagina.

Fallopian tubes.

Time of appearance.

Mesothelium.
Primordial cells.
Pflüger's ducts.
Germinal epithelium.
Broad ligament.

2. **The Ovaries.** According to Nagel, the mesothelium throws off cells at the genital ridge which assume the character of loose mesenchyma, and in which appear later large cells called the primordial cells or ova, and also the sexual cords, or Pflüger's ducts. By this proliferation of the germinal epithelium are developed the ovaries, which, as they enlarge, project more and more from the Wolffian body or future broad ligament. As Pflüger's ducts develop they include a large number of small or follicular cells, which completely surround the ova, and separate them from one another and form an epithelioid layer or follicle, called the Graafian follicle, around each ovum. The ovaries are first recognizable at the end of six weeks, and are distinguishable from the testes in the third month.

Cells surround ova.
Graafian follicle.
When recognizable.
Differentiation.

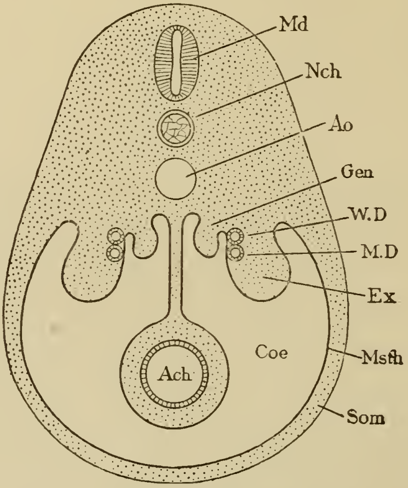


Fig. 82.—Diagrammatic Cross-section of a Vertebrate, Showing the Fundamental Relations of the Urogenital System. (*Minot.*)

Md. Medullary tube. Nch. Notochord. Ao. Aorta. Gen. Genital ridge, later transformed into the ovary. W. D. Wolffian duct, which undergoes atrophy. M. D. Müller's duct, which becomes the uterus and vagina. Ex. Excretory or Wolffian ridge. Msth. The mesothelium from which the peritoneal cavity and urogenital organs originate. Coe. Celom, or cavities of the mesothelium. Som. Somatopleure, or body wall. Ach. Archenteron, primitive canal from which the pharynx, lungs, and digestive organs are differentiated.

The *broad ligament* is the "persistent urogenital fold, reduced to a relatively thin suspensory membrane by the aborted Wolffian tubules. The *parovarium*, or *epoöphoron*, is formed from ten or fifteen Wolffian tubules." The *paroöphoron* is the remnant of the posterior part of the Wolffian body (Waldeyer).

3. **The Genital Cord.** The genital cord is the product of the union of the lower end of the urogenital ridges. It lies between the rectum posteriorly and the allantois anteriorly. When formed it gradually descends into the pelvis. (See par. 6.)

Union of urogenital ridges.

Position.

Descent.

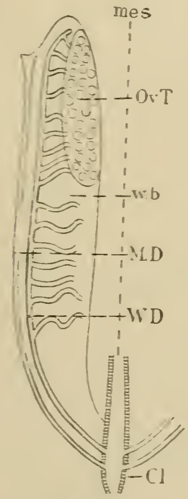


Fig. 83.—Diagram of the Indifferent Stage of the Urogenital System. (*Minot.*)

mes. Mesentery. Ov. T. Ovary or testicle. w. b. Wolffian body. M. D. Müller's duct. W. D. Wolffian duct. Cl. Cloaca, or terminal division of the intestines.

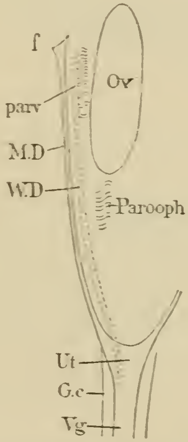


Fig. 84.—Diagram of Development of Female Sexual Apparatus. (*Minot.*)

W. D. Wolffian duct, atrophied. M. D. Müller's duct. G. c. Genital cord. f. Fimbriæ. parv. Parovarium or epoöphoron. Ut. Uterus. vg. Vagina. Ov. Ovary. Parooph. Paroöphoron.

4. **The Fallopian tube** is developed from that part of Müller's duct which runs along the Wolffian body, and which is not included in the genital cord below. When the Wolffian body becomes converted into the broad ligament, the Fallopian tube projects out of the edge of the urogenital fold, and after

From Müller's duct.

Broad ligament.

Projection of tubes.

Transverse.
Shape.

the third month changes its longitudinal course to a transverse one. It then elongates faster than the broad ligament, and may assume a tortuous or corkscrew shape (Nagel).

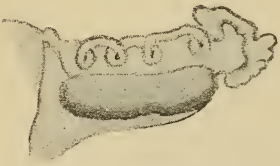


Fig 85.—Tortuous Course of a Fetal Fallopian Tube.

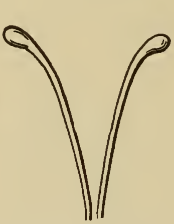


Fig. 86.—Müller's Ducts.

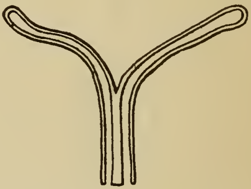


Fig. 87.—Coalescence of Ducts.

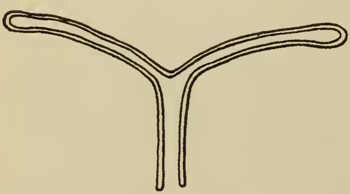


Fig 88.—Disappearance of Septum.

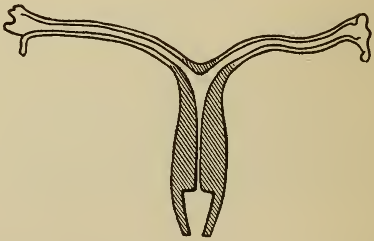


Fig. 89 —Appearance of Fundus and Cervix

Müller's ducts.
Gärtner's canals.
Time of union.
Complete.
Epithelium.

5. **The Uterus and Vagina.** After Müller's ducts have united to form the genital duct, the upper portion becomes the uterus, the lower portion the vagina (Bischoff). Traces of the remains of the atrophied Wolffian ducts, known as Gärtner's canals, are sometimes found in the lateral walls of the uterus. The union begins at the end of the eighth week, about two-thirds of the way down the cord, and progresses simultaneously upward and downward. The union is complete by the end of the third month. At this time the epithelium of the lower third or vagina assumes the character of pavement epithelium, and passes gradually into the cylindrical epithelium

Vagina formed.

of the upper portion, or uterus. The vagina is fully formed by the end of the nineteenth week.

During the sixth month an elevation corresponding to the location of the external os separates the uterus from the vagina. The mucous membranes of the vagina and cervix are thrown into longitudinal and transverse folds. The glands of the cervix appear about the middle of the fifth month, those of the uterine body and vagina not until after birth.

The hymen begins as transverse ridges on the posterior and anterior wall at the vestibule, early in the fifth month, which grow rapidly, and unite at the sides. It is composed of fibrillated connective-tissue, and possesses blood-vessels and nerves. Its function is to prevent the entrance of amniotic fluid into the vagina during uterine contraction, and to keep the urine out during micturition.

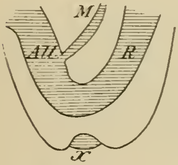


FIG. 90—SCHEME OF DEVELOPMENT OF FEMALE GENITAL ORGANS.

All. Allantois, which becomes the bladder later. *R.* Rectum. *M.* Müller's duct, which becomes the vagina later. *x.* The cutaneous depression that is to become the anus. (*Schroeder.*)

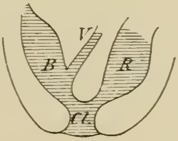


FIG. 91.—CLOACA FORMED WITH DESCENT OF THE TISSUE BETWEEN THE RECTUM AND THE ALLANTOIS.

V. Vagina. *R.* Rectum. *B.* Bladder. *Cl.* Cloaca. (*Schroeder.*)

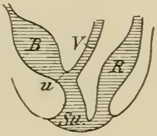


FIG. 92.—FORMATION OF UROGENITAL SINUS.

Su. By descent of perineal tissue. *u.* Urethra. (*Schroeder.*)

Allantois. Müller's ducts. Genital tubercle. Anal vestibule. Cloaca. Perineal tissue.

6. **The Development of the External Genitals.** The *allantois,* up to the time of the formation of the anus, is a prolongation of the intestinal canal. Müller's ducts open into the allantois a short distance in front of and above the anal region. On the cutaneous surface, about the fourth week, appears an elevation called the genital tubercle, in which a depression, called the anal vestibule, appears, and gradually deepens until it opens into the allantois and rectum, forming the *cloaca.* At the same time the perineal tissue between the rectum and allantois descends into the cloaca, drawing down

Urogenital sinus. Separation complete. Bladder, urethra. Vagina. Urachus.

Müller's ducts, and separating the rectum behind from a space in front called the *urogenital sinus*. The separation is completed about the tenth week. The allantois immediately above Müller's ducts develops into the bladder and urethra. As the urethra becomes relatively smaller and the vagina larger, the latter finally appears as if it were the continuation of the urogenital sinus. The upper end of the allantois becomes the urachus.

Clitoris and labia. Vulvo-vaginal glands. Development.

The *genital tubercle* develops into the clitoris and the labia minora. An elevation appears on either side of the genital tubercle about the tenth week, which develops into the labia majora. The *vulvovaginal* or *Bartholini's glands* are evaginations of the lower part of the urogenital sinus. They begin their development toward the end of the fourth month (Van Ackeren). By the sixth month they measure 1 × 1.8 mm. (Geigel).*

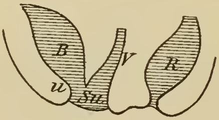


FIG. 93.—FORMATION OF PERINEUM AND URETHRA.
Su. By descent of perineal tissue. *u.* Urethra. (*Schroeder.*)

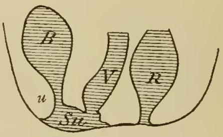


FIG. 94.—FULLY-FORMED GENITALS.
The urogenital sinus forms the vestibule separated from the vagina by the hymen. *Su.* By descent of perineal tissue. *u.* Urethra. (*Schroeder.*)

High situation. Position of vagina. Vulval fissure.

7. **The Genital Organ at Birth.** At birth the ovaries and uterus are situated high in the pelvis, or practically in the lower abdominal cavity. The vagina extends downward behind the elevated bladder in the direction of the pelvic outlet into the vestibule. The vulval fissure takes a more vertical direction than in the adult.

Ovaries.

The ovaries are approximately perfect in formation, and develop a few ova, but the follicles do not ripen until puberty. The uterine body is small and not more than half the size of the approximately well-developed cervix. The vagina is well developed, but roughened on its surface by large papillæ, which are the foundation of the folds or corrugations normally present in the virgin. These papillary folds are continued as far as the internal os uteri, and become altered later into the fully formed palmæ plicatæ. The vaginal pavement epithelium becomes transformed into the cylindrical variety in the cervix and corpus uteri, but the transition is not as sharply defined at the external os as it is in adult life. The hymen and external genitals are fully developed.

---

* The author has quoted freely from the descriptions in Minot's work on Embryology in the foregoing paragraphs.

Follicles. Uterus. Vagina. Papillæ. Palmæ plicatæ. Epithelium. Hymen.

The mucosa of the corpus, on account of its functional requirement, assumes definite characteristics toward puberty, and is more distinctly differentiated at the internal os from the cervical mucous membrane than that of the cervix is from the vagina. Pathological changes in the mucous membrane more readily pass the external os than the internal os.

CHAPTER II.

ANOMALIES OF DEVELOPMENT.

THE OVARIES AND FALLOPIAN TUBES.

1. **The Ovaries.** The ovaries may be absent, imperfectly developed, or deformed; or there may be a supernumerary ovary. Occasionally an excessive development at birth is observed.

Absence, etc.

Entire *absence* of the ovary has seldom been noticed. When it is absent there is usually an absence or a rudimentary state of the uterus. One ovary may be absent in connection with a one-horned uterus.

Rudimentary ovaries are small or flattened, and either have no Graafian follicles or only undeveloped germs of follicles; or the follicles may have developed and have disappeared. In a few instances they have been found concealed in the broad ligament without projecting upon the peritoneal surface (Fischel, Merridith, Brigidi). Usually there is also absence, defective formation, or imperfect development of the uterus. Idiots and cretins seem more than ordinarily subject to the deformity.

Deformities of the ovary are usually the result of constrictions partly separating a portion of it, thus producing what is called an *accessory ovary*, or giving rise to cystic degeneration.

Supernumerary ovaries are exceedingly rare. Those cases reported are usually accessory ovaries.

A *congenital descent* of the ovaries along the inguinal canal to the external ring or labium, often accompanied by a deformity of the uterus, is occasionally observed.

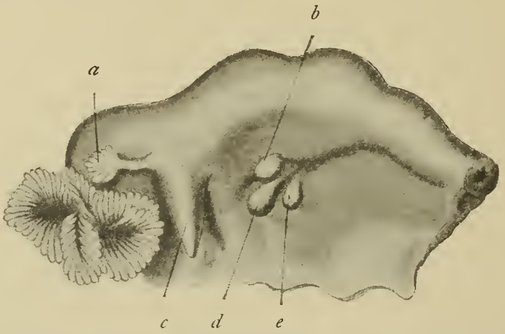


FIG. 95.—FALLOPIAN TUBE WITH FIVE ACCESSORY OSTIA, OR SUPPLEMENTARY TUBES. (*R. Kossmann.*)

a. Accessory ostium with fimbriæ. *b, d, e.* Three others with atresia. *c.* The same, cystic.

Müller's ducts.

2. **Fallopian Tubes, Uterus, and Vagina.** Certain malformations may result from imperfect formation of Müller's ducts, or from their imperfect union, or through atrophy or imperfect formation of one duct. Other malformations result from an arrest of growth after the first half of fetal life, when the organs have attained a considerable degree of development. The external organs may at the same time be well developed, the deformities being confined to the Fallopian tubes, uterus, and vagina.

Second half of fetal life.

External organs.

Seldom absent.

3. **Fallopian Tubes.** The Fallopian tubes are seldom absent except in connection with a deformed uterus. The absence or imperfect development of one tube is almost in-

Conditions.

variably connected with a one-horned uterus, or with imperfect development of the corresponding side of a two-horned uterus. Both tubes may be represented by a slight development of connective tissue, or by a cord extending along the upper edge of the broad ligament. The persistence of the fetal characteristics is sometimes observed, the tubes being twisted and their lumen thereby constricted in places (Fig. 85). On the other hand, the tube may be abnormally large (17 cm. or nearly seven inches, in length), or may have one or more accessory ostia with fimbriæ. One tube may be longer than the other.

Rudimentary.

Fetal characteristics.

Large.

Accessory.

Asymmetry.

CHAPTER III.

ANOMALIES OF DEVELOPMENT (*Continued*).

THE UTERUS.

The following are the chief forms of arrested development of the uterus during the first half of fetal life:

1. Absence of uterus, or defectus uteri.
2. Rudimentary uterus, or rudimentarius uteri.
3. The one-horned uterus, or uterus unicornis.
4. The two-horned uterus, or uterus bicornis.
5. The double uterus, or uterus duplex, or didelphys.
6. The two-chambered uterus, or uterus septus.

2. **Complete absence** of the uterus is difficult to distinguish in life from **rudimentary uterus**, and the cases are so rare that it is always presumable that the latter deformity is the one present.

Generally rudimentary.

By introducing the finger of one hand through the dilated urethra, and the finger of the other hand into the rectum, bringing them together far back in the pelvis, and then drawing them forward, a small flat or pear-shaped cornuted mass will be found on the posterior surface of the bladder, from which a cord, or the resistant edge of the broad ligament, can be traced across toward the lateral pelvic walls. Sometimes a small body the size of a pea or a small bean, representing the rudimentary ovary, will be felt at one or both ends. The uterus is usually solid, but may consist of a membranous sac with or without a neck. The vagina is usually absent, or consists of a shallow depression within the vulva. Menstruation does not occur, but in case the ovaries are somewhat developed menstrual molimina may be noticeable.

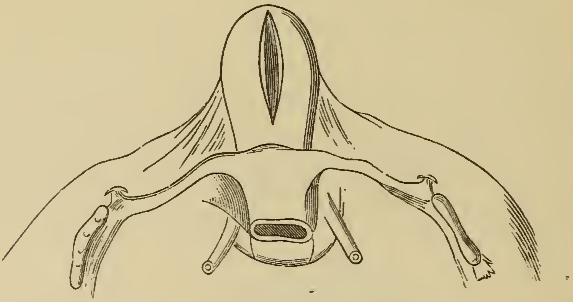


FIG. 96.—RUDIMENTARY UTERUS, LYING FLAT ON THE POSTERIOR WALL OF THE BLADDER. (*Langenbeck.*)

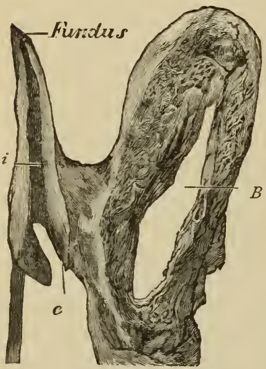


FIG. 97.—MEMBRANOUS UTERUS. (*Winckel.*)
B. Bladder. *e.* and *i.* External and internal os uteri.

Arrested development before union.

Shape.

Rudimentary.

Pregnancy.

3. The **one-horned uterus** results from an arrest in the development of one of Müller's ducts before union has taken place. It is usually, but not always, fusiform, and bends laterally to join the Fallopian tube. The other horn may be absent, but is in most cases rudimentary. Pregnancy in a rudimentary horn is, as a rule, followed by a rupture of the parts, but pursues a normal course when in the larger or fully developed side.

Want of union.

4. The **two-horned uterus** is the result of a want of union of Müller's ducts immediately below those portions

which normally form the Fallopian tubes. The want of union may be confined to the neighborhood of the tubes, leaving a **Degrees.**

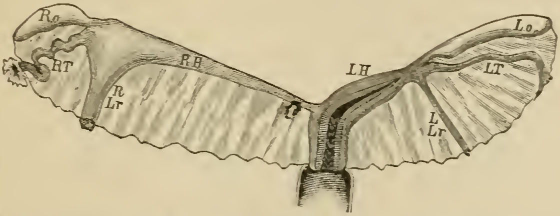


FIG. 98.—UTERUS UNICORNIS WITH RUDIMENTARY HORN. (*Schroeder.*)
L. H. Left horn. R. H. Right rudimentary horn. L. o. and R. o. Left and right ovary. L. L. r. and R. L. r. Left and right round ligament. L. T. and R. T. Left and right tube.

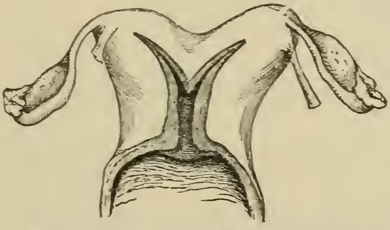


FIG. 99.—UTERUS BICORNIS. (*Schroeder.*)

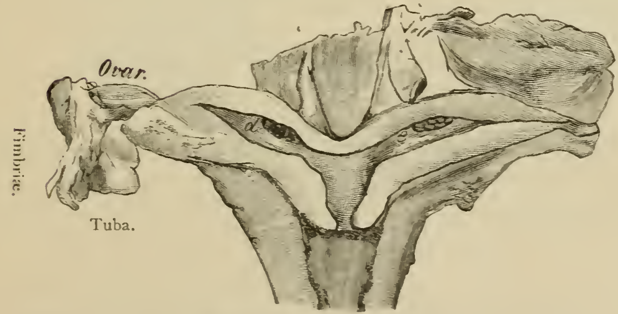


FIG. 100.—TWO-HORNED UTERUS WITH SINGLE CERVIX. (*Winckel.*)

slight depression in the fundus uteri (Fig. 99), or it may extend lower down, dividing a large part of the uterus, or it may extend into the cervix (uterus bicornis bicollis) (Fig. 101). A septum may or may not extend from the point of division **Septum.**

Flat fundus. down to or through the cervix, or even through the vagina. The uterus planifundus, or biangularis, or incundiformis, in which the fundus is flat instead of convex, may be considered as a variety of the two-horned uterus, due to the same kind of error in development. (Fig. 102.)

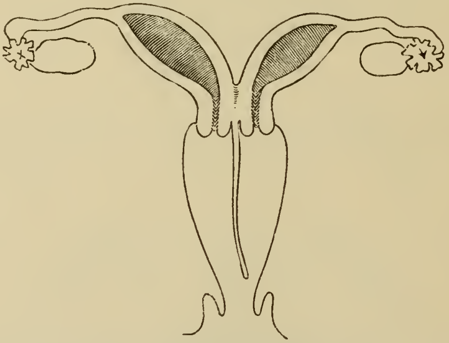


FIG. 101.—TWO-HORNED UTERUS WITH DOUBLE CERVIX. (*Schauta.*)

Want of union. 5. The **double uterus** results from a want of union of Müller's ducts as far as the vagina, in consequence of which

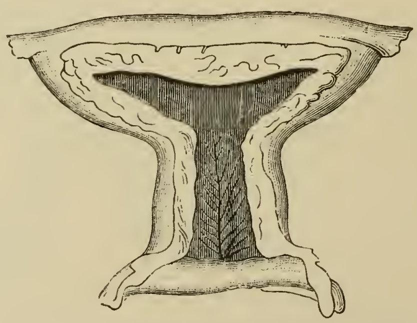


FIG. 102.—UTERUS WITH FLAT FUNDUS. (*Oldhain.*)

Vagina and cervix. two uteri have developed. The vagina and cervix may or
Tube may not be double. One Fallopian tube belongs to each uterus.

Imperfect union. 6. The **two-chambered uterus**, or *uterus septus*, results from an imperfect union of Müller's ducts. The uterus is of normal shape, but the septum has not been obliterated. The vagina is apt to be similarly divided. When the septum does not extend through the whole length of the uterus, it is called *uterus subseptus;* when it extends to the internal os only, it is called *uterus septus unicollis.* Occasionally the septum exists only in the cervix, or only in the cervix and vagina.

Vagina.
Imperfect septum.
To internal os.
Septum below internal os.

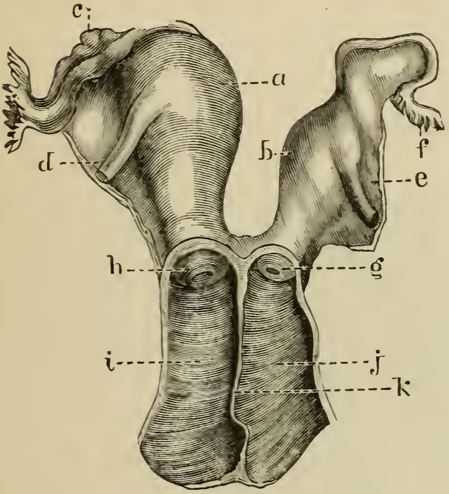


FIG. 103.—DOUBLE UTERUS. (*Ollivier.*)
a. Right cavity. b. Left cavity. c. Right ovary. d. Right round ligament. e. Left round ligament f. Left tube. g. Left vaginal portion. h. Right vaginal portion. i Right vagina. j. Left vagina. k. Portion between the two vaginæ.

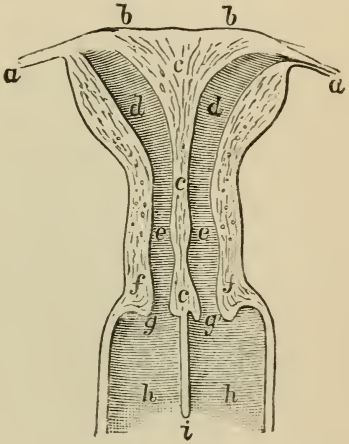


FIG. 104 —TWO-CHAMBERED UTERUS. (*Kussmaul.*)
a, a. Fallopian tubes. *b, b.* Fundus. *d, d.* Uterine cavities. *e, e.* Cervical cavities. *h, h.* Vaginal cavities. *c, c, c, i.* Septum between uterine and vaginal cavities. *f, f.* Cervix. *g, g.* External os.

7. **The diagnosis** of these deformities usually requires the aid of anesthesia. The bimanual examination, with the thumb in the vagina and finger in the rectum, reveals the external shape. Or the uterus may be held down by a vulsella attached to the cervix, and thus the fundus be brought within better reach of the finger in the rectum. A sound introduced into the uterus also aids the bimanual palpation. A speculum ex-

Anesthesia.
Bimanual exam.
Traction by vulsella.
Sound.
Speculum.

amination with the use of the sound enables us to judge of the character of the interior.

Symptomatic.

8. **Treatment** is of no benefit except to relieve symptoms. Painful menstrual molimina in cases of absence of rudimentary development occasionally require castration for their relief.

Castration.

Arrest of development after union of Müller's ducts.

9. The following are the chief forms of arrested development of the uterus after the first half of fetal life.

1. Fetal and infantile uterus, or uterus fœtalis and uterus infantilis.
2. Puerile uterus, or uterus pubescens.
3. Puerile cervix, or uterus parvicollis.
4. Congenital displacements.

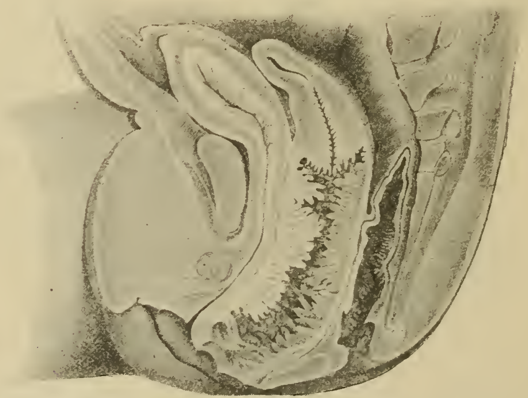


FIG. 105.—FETAL UTERUS AND VAGINA, SHOWING PAPILLARY FOLDS OF VAGINA. (*W. Nagel.*)

Remains as before birth.

10. **Fetal uterus** denotes persistence of the characteristics of the uterus that belong to the latter portion of fetal life (Figs. 63, 105, and 106). The cervix may be long and thick, but the body is small and cylindrical, and may be solid. The cervix is about 2.5 cm., or one inch, the uterus less than 1.25 cm., or not quite half an inch, long (Winckel). The papillary folds of the vagina extend throughout the entire canal.

Cervix.

Corpus.

Comparative length.

Papillary folds.

11. **Infantile uterus** denotes a persistence of the size and shape of the uterus as it was at the time of birth (Figs. 64 and 107). The plicæ palmatæ extend high up, the cervix being almost twice the length of the corpus. The vaginal portion, however, is short. Retroversion is sometimes present. The vagina and external genital are usually small.

Remains as at birth.
Plicæ palmatæ.
Vaginal portion.
Retroversion.
Vagina and vulva.

12. Women with such uteri seldom menstruate, or have any sexual appetite. Conception is impossible. Chlorosis, a diminutive heart, and a general hypoplasia of the vascular system are not infrequent concomitants.

General characteristics.
Chlorosis, etc.

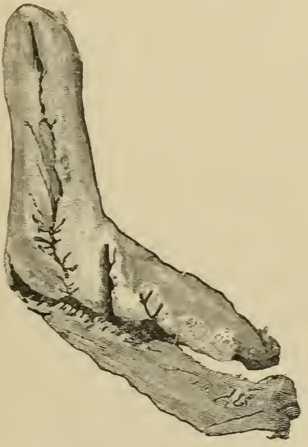


FIG. 106.—FETAL UTERUS AND VAGINA. (*Winckel.*)

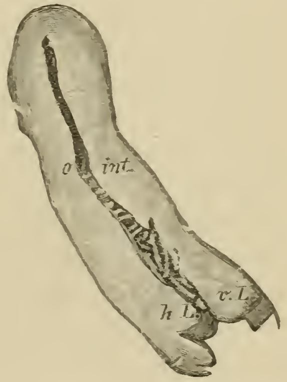


FIG. 107.—INFANTILE UTERUS. (*Winckel.*) *o. int.* Internal os *v. L.* Anterior lip. *h. L.* Posterior lip.

The *diagnosis* is made the same as for the preceding deformities.

The *treatment* is of a general tonic and hygienic character.

13. **The puerile uterus** differs from the infantile uterus in that the vaginal portion, although small and conical, is longer, and the body, although small, is about as long as the cervix. The vagina and external genitals are usually proportionately

Vaginal portion.
Body.
Vagina and vulva.

General condition.

small, the general appearance childish or girlish, and the health often delicate.

Cervix. Corpus. Pathological changes. Stenosis.

14. **The puerile cervix** has a small pin-head os, is small and conical, although sometimes flattened in shape, but may project well into the vagina. The corpus is of about normal length, but a trifle narrower and rounder than normal. In connection with anteflexion and endometritis, the cervix becomes thicker, the os is widened and sometimes slightly everted, and *stenosis*, if not already present, results from the thickening of the mucous and submucous tissues.

Menses. Sterility. Nervous disturbances.

15. The *symptoms* of these deformities are a late appearance, scantiness and infrequency of the menses, particularly in the puerile uterus. Cramping pains are felt just before the onset of the menses, and mechanical dysmenorrhea (part 4, chap. IV, par. 13) becomes the most prominent symptom as endometritis develops. Sterility is the rule. Nervous disturbances and anemia are frequently observed.

Puerile uterus. Puerile cervix.

16. The *diagnosis* of puerile uterus is made by the discovery of the small size of the uterus, the conical cervix, the narrowness of the canal, and the small size of the vagina. The puerile cervix is similar, although occasionally larger from inflammation, and the corpus uteri and vagina are often quite well developed.

Corpus normal. Corpus puerile.

17. The *prognosis* is favorable if the body of the uterus is nearly normal in size, and inflammation has not lasted long. When the body is puerile the sterility is apt to be permanent.

Tonics, etc. Dilation. Bipolar faradism.

18. The *treatment* should include the administration of tonics and the regulation of the diet and habits. Dilation of the cervix by slippery-elm tents, used two or three times a week with antiseptic precautions, and left each time for ten or twelve hours, is beneficial in cases of moderate deformity. The patient withdraws the tent by means of a string attached, and immediately uses a sterilized vaginal douche. Intra-uterine bipolar faradism is sometimes beneficial if persistently used.

Pelvic massage may be useful as an adjuvant. (See part 1, chap. v, par. 5 to 12.)

Massage.

Vulliet's method of permanent dilation with small pieces or balls of cotton is sometimes applicable. (See part 1, chap. IV, par. 16.)

Permanent dilation.

Divulsion by the forcible method recommended for anteflexion may be required for cases in which the canal is narrowed as the result of endometritis (part 7, chap. VIII, par. 16. See also part 4, chap. III, par. 17).

Divulsion.

19. **Congenital displacements,** particularly anteflexion, retroversion, and displacements forward, laterally, and backward, may result from a want of symmetrical development of the different portions of Müller's ducts and the Wolffian bodies. Those which are of practical importance will be discussed in connection with uterine displacements (part 6, chap. II, par. 3, and chap. III, par. 2). Congenital prolapse has been observed in a few cases, and exists in connection with imperfect development of the pelvic organs, particularly with cases with spina bifida (Heil).

Asymmetrical development.

Prolapse.

20. **Hypertrophy of the Uterus.** A true hypertrophy of the uterus consists of an enlargement and multiplication of the muscular fibers to a greater degree than the connective-tissue elements. The mucous membrane usually parcipitates in the hypertrophy. The hyperemia is largely venous and the lymph spaces are enlarged. The condition after a time may pass into that of hyperplasia (part 7, chap. IX).

Muscular fibers.
Mucosa.
Veins and lymph spaces.
Hyperplasia.

The *causes* are retention of the menses, disease of the endometrium accompanied by enlargement of the same, uterine and pelvic tumors, and foreign bodies retained in the uterus.

Menses.
Endometrium.
Tumors.
Foreign bodies.

The *symptoms* and *treatment* are those of the diseases that produce the condition. The hypertrophied uterus is rounder than the subinvoluted and softer than the hyperplastic organ.

Diseases that cause it.
Comparison.

21. **Atrophy and Hyperinvolution of the Uterus.** *Atrophy* is characterized by a diminution of the substance of

Definition.

the uterus. It may consist merely of a symmetrical diminution in size, or of a thinning of the walls, or of a softening of the muscular and fibrous tissues. The latter are usually also connected with more or less decrease in size. The mucous membrane undergoes atrophy, but in some cases has been destroyed by inflammation and cicatricial contraction, or by traumatism.

Walls.

Mucous membrane.

Cause.

22. *Hyperinvolution* may follow labor as a result of abundant or prolonged lactation, more particularly when following a previously diseased condition of the uterus, or when accompanying general states of depressed vitality. This hyperinvolution may go on to an advanced atrophy of the uterus and ovaries and a permanent menopause; or the changes in the uterus and ovaries may stop short of permanent atrophy, and the organs return to a normal condition after the causes have ceased to operate.

Results.

Abnormal involution.

23. Atrophy may result from abnormal involution in connection with puerperal disease. The fatty degeneration of the muscular fibers is excessive and the regenerative changes feeble, resulting in a small, pale, softened uterus, easily torn by dilators or perforated by the sound (Schroeder and Hofmeyer).

Softened uterus.

Puerperal injuries.

Puerperal injuries and sepsis, that destroy the uterine mucous membrane and portions of the walls, may be followed by cicatricial contraction and atrophy of the remaining portions.

Curettage and cautery.

Destruction of the uterine mucous membrane by excessive curettage or cautery may give rise to cicatricial contraction, with a partial or complete obliteration of the uterine cavity and atrophy of the walls.

Compression and stretching.

Compression and stretching of the uterus by tumors, exudates, etc., to such an extent as to seriously interfere with its nutrition, are occasional causes.

Premature senile atrophy.

Senile atrophy may be anticipated in virgins in whom the sexual system has never been vigorously developed, particularly in those cases in which hardship, tuberculosis, congenital syphilis, and other general conditions diminish the vitality and suppress the sexual activity.

24. The *diagnosis* is based upon the discovery of the small size or flabby consistency of the uterus, or of both. Bimanually, the uterine body feels small, or can not be recognized. The sound passes less than two inches, or it may encounter an indefinite resistance and then pass for several inches, and be detected through the abdominal walls, the soft fundus having been perforated. The cervix is as a rule small, and the vagina often narrow.

Small and flabby.

Sound.

Easily perforated.

Perforation of the fundus uteri by the uterine sound has occurred thrice in the author's practice. It seldom, if ever, causes any trouble to the patient, if the surgeon employs the proper antiseptic precautions in his examinations. Without such precautions the result may be serious.

25. The *prognosis* is usually unfavorable, except in those mild cases dependent upon lactation and systemic depression.

Unfavorable.

Exceptions.

26. The *treatment* must be chiefly concerned with the removal of the general and local conditions upon which the disease depends. Abundant nourishment, phosphorus, iron and strychnin, exercise in the fresh air, and freedom from responsibility and depressing influences are important factors.

Remove cause.

Tonics, etc.

The local remedies recommended in paragraph 18 may be tried, but they will seldom be found to be efficient, and must be used with caution in cases in which the uterine walls are flabby.

Local remedies.

CHAPTER IV.

ANOMALIES OF DEVELOPMENT (*Continued*).

THE VAGINA AND HYMEN.

1. **The Vagina.** Deformities of the vagina may be divided into four classes :

1. Absence and rudimentary development.
2. Double or septate deformities.
3. Unilateral deformities.
4. Fetal and puerile vagina.

Absence. 2. **Absence of the vagina** occurs usually in connection with absence or rudimentary development of the uterus ; but the vagina may be rudimentary when the uterus is normal. Rudimentary.

Varieties. **Rudimentary development** may consist in a pouch at the cervical extremity, or a shallow sac or depression at the vulval end, or of a closed sac in the middle portion. Or there may be perforated or closed transverse partitions of variable thickness between the two ends. Sometimes a pouch or sac above and another below overlap each other. These deformities depend either upon imperfect development of Müller's ducts, or upon diseased conditions acting after the formation of the vagina. Causes.

When the vaginal outlet is closed, the vagina occasionally has an opening into the bladder, urethra, or rectum. On the other hand, impregnation and delivery have occurred through the anus, the vagina communicating with the rectum instead of opening externally.

With double uterus. 3. **A double vagina,** fully developed, is only found in connection with a double or septate uterus. When the uterus is normal, one side is always rudimentary.

Varieties. A double vagina may exist with closure of the lower end of one or both sides, or a septum is sometimes found forming a lateral pouch, or partly dividing the vagina in an irregular way. One vagina may be rotated partly in front of its mate. Rotation.

4. **A unilateral vagina** developed from one of Müller's ducts is seldom diagnosed unless in connection with a one-horned uterus, or with partial development of the other duct. Bloody cysts of the vagina may be the rudimentary portions of the undeveloped Müller's duct (Freund). The unilateral vagina is usually narrow. Seldom recognized. Cysts. Unilateral vagina.

5. **Fetal and puerile vaginas** exist in connection with similar conditions of the uterus, although the vagina may be small with an approximately well-developed uterus. Conditions of uterus.

In a few instances a ureter has been found to open directly into the vagina (L. L. McArthur).

6. The *treatment* of these conditions will be considered in connection with atresia of the genital organs (chap. VI., par. 18).

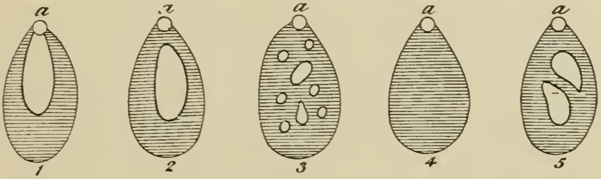


FIG. 108.—VARIOUS FORMS OF HYMEN (DIAGRAMMATIC). (*Lewers.*)
1. Crescentic form (the most common). 2. Circular form (nearly as common). 3. Cribriform hymen. 4. Imperforate hymen. 5. Hymen biseptus. *a*. Urethral orifice.

7. The **hymen** may be absent if the lower end of the vagina be absent, or it may be double with double vagina. Relation to vagina.

It may have several distinct openings, or the opening may be divided by a narrow strip of tissue (hymen septus), or there may be none (imperforate hymen). Openings.

The opening may be longitudinal or circular, and situated in the center, in the upper third, or at the circumference under the urethra—all of which may be called normal. The hymen varies greatly in thickness, vascularity, and elasticity.

CHAPTER V.

ANOMALIES OF DEVELOPMENT (*Continued*).

THE VULVA.

The deformities of the vulva may be grouped under the following heads:

1. Absence of the vulva, or defectus vulvæ.
2. Rudimentary or imperfect development, or rudimentarius vulvæ.
3. Persistence of the cloaca, or atresia ani vaginalis.
4. Persistence of the sinus urogenitalis.
5. Hypospadias.
6. Epispadias.
7. Hermaphrodism.
8. Hypertrophy.

Genital tubercle.

Allantois.

Life not maintained.

1. **Absence of the vulva** is the result of non-development of the genital tubercle, neither the urethra, vagina, nor rectum having an external opening. The separation of the allantois from the rectum in some cases has taken place, and in others has not. Under these conditions life can not be maintained.

Any part.

2. **Rudimentary** or **imperfect development** of the whole vulva, or of the different parts—labia majora or minora, clitoris, and perineum—may exist, with an opening for the sinus urogenitalis or the normal vagina.

Persistence.

The childish type of vulva may persist in later life.

Description.

3. **Persistence of the cloaca,** erroneously called *atresia ani vaginalis,* and a failure of the downward growth of the perineal septum, may persist, the urethra, vagina, and rectum opening into it.

Description.

4. **Persistence of the sinus urogenitalis,** completely separated from the rectum by the formation of the perineum,

has been observed. The vagina and urethra open into it. The sinus may be long and narrow and the clitoris hypertrophied, simulating male hypospadias. Simulating male hypospadias.

5. **Hypospadias** denotes an absence of the urethra, the allantois having developed into the bladder down to its junction with the vagina. The vagina and bladder open directly into the vulva. Description.

6. **Epispadias** is an absence of the anterior wall of the urethra. The clitoris is, as a rule, divided. The deformity is caused by a delay of the allantois to communicate with the external parts. Description.

The graver form, in which the pubes are cleft and the anterior bladder wall, as well as the urethra, is absent, is not, properly speaking, a deformity of the vulva.

7. *Treatment* is of but little benefit in such deformities, except to place the rectal opening in its proper place and construct an artificial urethra from the surrounding parts. Place rectal opening. Artificial urethra.

When the rectum opens into the cloaca, a median incision in the skin between the coccyx and cloaca should be made, the rectum dissected from its lower connection, and, after being slightly twisted on its long axis (Gersung), stitched to the cutaneous edges of the incision. The twist prevents the escape of feces except under pressure, and thus compensates for the want of a sphincter.

8. **Female hermaphrodism** is a deformity of the vulva by which the male organs are simulated. As a rule, the clitoris is enlarged, and the labiæ are united and thus resemble a scrotum. The sinus urogenitalis (or the fully formed urethra and vagina) has a small opening under the clitoris, giving the appearance of a male hypospadias. The condition is merely a simulated hermaphrodism. The mammary region and general appearance are apt, like the vulva, to present characteristics of the male. Simulates male organs. Description. Mammæ.

The inner genitals are sometimes deformed, or of the male type, and the ovaries may have descended into the labia, giving them a still greater resemblance to a scrotum. One of Müller's ducts may be developed into a Fallopian tube, uterus, and vagina, while on the other side the Wolffian duct may be developed into an epididymis and the male ducts.

True hermaphrodism implies the presence of the essential organs of generation of both sexes in the same individual. It does not exist to the extent of enabling a human individual to perform the functions of both sexes, although a rudimentary ovary and testicle have been found in the same person.

Common. Large size. Like wings. To knees. Divided. Meet near anus.

9. **Hypertrophy of the external genitals** is common. The labia minora frequently attain a large size, and project like wings between the labia majora, instead of being almost concealed. Among the Bushmen and Hottentots they have been known to hang down almost to the knees. Sometimes they are divided, forming two or more ridges on one or both sides of the clitoris; at other times their bases extend down and meet in front of or behind the anus.

Clipped and sutured.

If they cause trouble from their size, they may be clipped off, and the edges be sutered with fine silkworm-gut sutures.

Lengthened. Interference. Amputation.

The **clitoris** may be hypertrophied with or without enlarged labia minora. In extreme cases it is one or two inches long when erect, and may interfere with coitus or with the direction of the stream of urine. In such cases it may be amputated.

CHAPTER VI.

ATRESIA AND STENOSIS OF THE GENITAL CANAL

(GYNATRESIA).

Definition. Location.

1. **Atresia** and **stenosis** are terms used to designate the complete and partial obliteration of a portion of the otherwise well-developed genital canal, and may be either congenital or acquired. The atresia or stenosis may be in the vulva, hymen, vagina, or at the external or internal os uteri.

2. **Pathology and Etiology.** The *congenital varieties* are due to an arrest in development in the parts, such as has been described in the preceding chapters, or to the influence of inflammatory action between the period of development and birth. Imperforate hymen is the most common variety of atresia; occlusion or absence of the lower portion of the vagina next. One or more constrictions or obstructing membranes may exist in the course of the vagina. When the upper portion of the vagina is wanting, it is usually absent altogether. One or both sides of a double vagina accompanying a septate uterus may be occluded. The external or internal os uteri, or the entire cervix, may be occluded or stenotic.

Arrest of development or inflammation.

Imperforate hymen.

Vaginal deformities.

Cervix.

Atresia in a double, septate, or unilateral uterus or vagina, may be due to an error in development; atresia in a single vagina or uterus is acquired after the development is complete, and is, as a rule, of inflammatory origin (Nagel, Veit). Hematosalpinx results from the latter conditions only.

Double uterus, etc.

Single uterus, etc.

Hematosalpinx.

3. *Acquired atresia and stenosis* may be in the vulva or vagina, as the result of adhesion of the labia following inflammation in childhood.

Adhesion of labia.

Ulceration, sloughing, or gangrene, with cicatricial contraction, whether due to disease, chemical agents, external injury, or childbirth, may obliterate the vagina or cervix. Cautery and amputation of the cervix, and cervical tumors, are particularly apt to produce cervical stenosis.

Ulceration, etc.

Operations, tumors.

A puerile cervix may, as the result of inflammation, become stenotic, or the hyperinvolution following prolonged lactation and senile involution may render the internal os too small for the free passage of the secretions.

Inflammation.

Hyperinvolution.

4. **Results of Atresia.** In childhood bad effects are not noticed, except in rare instances, on account of an accumulation of mucus. After puberty an accumulation of blood occurs in the parts above the place of atresia, which, by reason of absorption of the serum, shrinkage of the corpuscles, and

In childhood.

After puberty.

admixture of mucus, becomes dark in color and syrupy in consistence.

At hymen or lower end of vagina.

When the hymen or lower end of the vagina is occluded, the accumulation is at first confined to the vagina, but later dilates the cervix (hematocolpos).

At lower portion of vagina.
Cervix.
Uterus.
Vagina.
Rupture.
Abnormal outlet.

When a considerable portion of the lower vagina is occluded, the cervix becomes widely distended, and finally the internal os may be dilated. As a rule, the uterus does not become greatly expanded. The vagina undergoes hypertrophy as well as distention. When the accumulation becomes too great, rupture may take place through the hymen with relief, or through the cervix into the peritoneal cavity, or more often into the pelvic connective tissue. In the latter case an outlet may be established through the rectum, bladder, upper intestines, or external surface of the body.

At ext. or int. os.
Uterine cavity.
Walls.
Internal os obliterated.
Rupture.

When either the external or internal os is occluded, the uterine cavity becomes distended (hematometra) and globular. The uterine walls are usually hypertrophic, but may, in case the accumulation has been rapid, or has existed for a long time, be very thin. When the occlusion is at the external os, the internal os is obliterated, and the cervical and uterine cavity are one. Rupture through the cervix or external os into the vagina may take place.

In one side.
Dilation and rupture.
Suppuration.

When the atresia is in one side of a double vagina and divided uterus, the occluded side of the uterus becomes dilated, and sometimes ruptures through the cervical septum, as this is generally the weakest place. In such a case the secretions gravitate into the vaginal pocket below, and become purulent in character.

In both sides.
Rare.

Accumulations may take place in both sides of a double uterus and double or single vagina, with similar results as in a single uterus and vagina. This condition of affairs is very rare.

Due to inflammation and occlusion.

5. **Accumulations in the Fallopian tubes** (hematosalpinx) are the result of a previous inflammation and occlusion of

the tube. The blood may enter through the uterine end, or be effused within the tube as the result of the tubal inflammation, or as the result of the interference of the distended uterus with the tubal circulation. As the hematosalpinx increases in size, old adhesions may be ruptured, causing rupture of the tube, hematocele, or a peritonitis which may prove fatal.

Sources of the blood.

Results.

6. **Accumulations due to stenosis** are usually mucous (hydrometra) or bloody, although pus may be retained (pyometra) in cases of malignant disease, sloughing fibroid, retained lochia, etc. The fluid is, as a rule, in the uterus, and seldom leads to a dilation of the Fallopian tube. It does not distend the uterus as greatly as in cases of atresia, and may force an outlet at the place of constriction, and reaccumulate. In a few instances it undergoes decomposition, with formation of gas (physometra) and discharge of the latter through the vagina.

Nature of fluid.

Location.

Amount, etc.

Gas formation.

Mild forms of stenosis, with but temporary retention, are due to anteflexion, a puerile cervix, perforated vaginal septa, and adhesion of the labia. The results in such forms of cervical stenosis are inflammation of the endometrium and ovaries, and sometimes infection. The stenoses from adhesion of the labia and perforated septa seldom interfere seriously with menstruation, but they are obstacles to the performance of the marital functions.

Causes.

Results.

Adhesion of the labia, and perforated septa.

7. *Symptoms.* The symptoms of *atresia* commence at puberty. Pelvic cramp-like pains are felt once a month, lasting for a few days, which, from month to month, gradually become more severe in character and longer in duration. In time they become constant, with monthly exacerbations and increasing interference with the evacuations of the bladder and rectum, until finally rupture takes place. The menses do not make their appearance. A fullness in the lower abdomen may become perceptible.

Puberty.

Monthly pain.

Constant pain.

Bladder and rectum.

Amenorrhea.

Lower abdomen.

After internal rupture the symptoms of peritonitis, hemato-

Internal rupture.

External rupture.

cele, hematoma, or pelvic abscess supervene, according to the place of its occurrence. Rupture externally affords relief.

One side of double vagina.

When low down, etc.

When one side of a double vagina and uterus is occluded the menstrual discharge appears externally, either irregularly or at lengthened intervals. When the atresia is low down in the vagina and rupture occurs in the cervical septum, intermittent discharges of pus with symptoms of sepsis follow.

Less severe.

Uterine colic.

Discharges.

Subsidence.

8. The symptoms of *stenosis* are usually less severe, and consist mainly of uterine colic, with or without intermittent discharges. In time the uterus, particularly the senile uterus, loses its power of contraction and the symptoms subside.

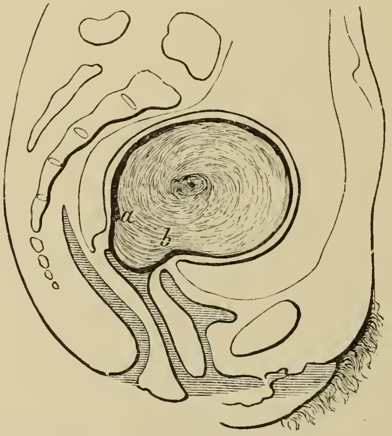


FIG. 109.—ATRESIA OF EXTERNAL OS UTERI. (*Schultze.*)

Mechanical dysmenorrhea.

Anteflexion with a puerile cervix gives the symptoms of mechanical dysmenorrhea (part 4, chap. IV, par. 13), with those of inflammation later.

Monthly pain.

9. **Diagnosis.** Monthly abdominal and pelvic pains in a young woman who has never menstruated lead us to suspect the trouble.

Mass between labia.

Atresia of the hymen is recognized by the bulging of a reddish or bluish mass between the labia, which can be felt as a rounded elastic tumor between the fingers of one hand on the vulva or in the rectum, and those of the other hand over the pubes. The bladder should be previously evacuated.

Felt bimanually.

10. When the *lower end of the vagina* is occluded the tumor does not distend the vulva, but is felt by the rectal-bimanual palpation to extend to or into the uterus; the upper portion of the uterus, being less distended, if at all, is recognized on top of the mass. In case of hematoma or hematocele with normal vagina, the uterus is in front or at one side of the tumor.

Extends to uterus.

Fundus uteri on top.

At one side.

11. When the *whole vagina* is occluded, the enlarged globular uterus is palpated in the same way, and a space between it and the vaginal entrance is recognized by the rectal finger. It must be borne in mind that the uterus may be bicornute, and there may be a distended rudimentary horn. In the latter case the well-developed horn will also be distended and laterally situated, while the smaller accumulation in the rudimentary horn will be felt to have a pedicle arising from the neighborhood of the cervix.

Whole vagina.

Two-horned uterus.

Well-developed horn.

Rudimentary horn.

12. When *one side of a double uterus and vagina* is occluded low down in the vagina, a long, cystic tumor extends along the vaginal wall, sometimes a little anterior or posterior to it instead of beside it. It may be continuous, with a similar enlargement besides the pervious uterus, which in rare instances extends toward the other side, forming one of the horns of a two-horned uterus. Cysts of the vagina are rounder, and do not extend longitudinally as far along the vaginal canal. If the cervical septum have ruptured, the enlargement will be wanting, but a boggy mass or loose sac will be felt in the vaginal wall which, when compressed, causes pus to flow from the cervix. The speculum should be introduced, the cervix dilated, and the opening sought with the probe. Pressure on the vaginal pus sac causes the pus to appear at the opening.

One side of double uterus.

Two-horned uterus.

Cysts of vagina.

Ruptured cervical septum.

Seek opening.

Pus appearing.

13. When the *external os* is occluded, the vaginal bimanual

No vaginal portion. Cervical fibroid. One side of two-chambered uterus. Unilateral atresia.

palpation finds no vaginal portion of the cervix, the vagina leading to a round, elastic tumor occupying the position of the uterus. A cervical fibroid is known from it by the discovery of the permeable os, and by its firmer consistence. If the atresia be in one side of a two-chambered uterus and cervix, the os uteri will be discovered as a lateral crescentic slit extending part-way around the lower end of the tumor. In all cases of unilateral atresia with accumulation, menstruation will have been established.

Tumor. Other tumors. Sound.

14. If the *internal os* is occluded the round, elastic uterine tumor will be felt. Other tumors of the uterus do not produce the same roundness and elasticity in connection with amenorrhea. The sound will not pass the internal os, or, if the entire cervix is occluded, it will not enter the cervix.

In rudimentary horn. Hematosalpinx. Dilated tubes. Gentleness.

15. In all cases of atresia of the whole vagina or cervix, the possibility of accumulation in a rudimentary horn, and the probability of hematosalpinx, should lead us to carefully palpate per rectum the space behind the uterus. The dilated tubes are felt as separate but adherent enlargements, usually adherent in the pelvis. The palpation should be gentle for fear of rupturing the tubes.

Difficulty. Elastic, round. Sound. Causes present.

16. The diagnosis of retention due to *stenosis* is more difficult, since the uterus is usually only moderately enlarged. The corpus possesses the same elastic roundness to the touch as in atresia, the cervix is impervious to the sound, and the diseases which cause the latter, such as carcinoma, fibroma, or atrophy of the cervix, are present.

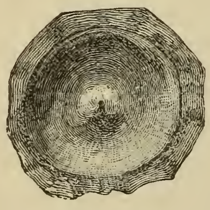


FIG. 110.—STENOSIS OF EXTERNAL OS. (*Winckel.*)

Colicky pains. Discharge.

In the early stages colicky uterine pains are characteristic, and are sometimes followed by a discharge of mucus, blood or pus from the uterine cavity.

Without retention.

Stenosis of the cervix without retention is known by the character of the dysmenorrhea, the puerile condition of the cervix, the anteflexion, if it also exists, and the difficulty in sounding the uterus.

Mortality of atresia.

Of hymen and half of double track.

17. The **prognosis** of atresia is unfavorable, since about 75 per cent. die if left to their fate. Atresia of the hymen and atresia in one-half of a double genital tract have a more favorable prognosis, because the rupture is apt to occur externally or into the pervious side.

Stenosis.

Stenosis seldom causes death, but is often followed by considerable hyperplasia or inflammation of the uterus and adnexa.

Hymen.

18. **Treatment of Atresia.** Atresia of the hymen is best treated by a crucial incision, followed, if the membrane is fleshy, by its excision and the suture of the raw edges with fine silkworm-gut.

Lower vagina.

Bladder and rectum.

Washing out.

Size of fetal head, or Fallopian tubes dilated.

Rupture of adhesions.

Hematosalpinx.

When a small portion of the lower vagina is occluded, the septum should be punctured by a trocar, the opening enlarged by lateral incisions, and if possible the vaginal edges be brought down and stitched to the edges of the hymen or vulva. The positions of the bladder and rectum should first be determined by catheterization and rectal indagation. Ordinarily the sac may be irrigated with sterilized normal salt solution (0.6 per cent.) until the fluid returns clear. If the accumulation exceeds the size of a fetal head, or if the Fallopian tubes are dilated, it is better merely to make the opening and allow the fluid to escape gradually (Hofmeier, Matthews, Duncan) and wait a week—unless an odor of decomposition or septic symptoms be noticed—before enlarging and washing it out. Immediate evacuation of all of the fluid sometimes causes a rupture of peritoneal adhesions from a too rapid contraction of the tumor and descent of the uterus and tubes. If there be hematosalpinx, pressure over the abdomen should not be made.

19. Should the atresia be in one side of a double vagina and

Excise septum. Slit up whole septum.

uterus, a portion of the vaginal septum should be excised (Schroeder). If an opening already exists in the divided cervix, and pus has accumulated in the vaginal pocket, the whole vaginal septum should be slit open.

Perineal incision. Separation of bladder and rectum. Trocar. Evacuation. Dilate opening. Pack with gauze.

20. When a large portion of the vagina is absent, a transverse incision is made across the perineum, and, while the bladder and rectum are guarded by the catheter in the former, and the assistant's finger in the latter, the tissues are separated with the finger ends and scalpel handle until the accumulation can be felt, when a curved trocar is introduced. The contents are slowly evacuated and the uterus washed out thoroughly with the normal saline solution. The opening should be dilated until one or, if possible, two fingers can be introduced. It may then be packed with iodoform gauze, or a large glass drainage-tube be introduced (Breisky).

Difficulty. Flaps. Reaccumulation. Abdominal section.

Great difficulty may be experienced in preventing cicatricial contraction and stenosis of the vagina. If flaps can be brought from the vulva and stitched to the depressed edges of the sac, the difficulty will be overcome. In many cases, however, in spite of a tube and repeated dilations, the opening will close and the accumulation recur, and it may become necessary to arrest menstruation by an abdominal section and removal of the adnexa.

Hysterectomy. Oophorectomy.

When all, or nearly all, of the vagina is occluded, and there is an accumulation beyond, it is better to remove the uterus and adnexa by a primary abdominal section (Michin), or, if the uterus can not be removed without serious difficulty, to remove the adnexa alone (Sanger).

Puncture through the bladder or rectum should not be attempted. An abdominal section and complete removal of the parts, or removal of the adnexa and stitching of the uterine sac into the abdominal wound, is preferable.

Puncture with trocar.

21. When the occlusion is in the cervix, and the tubes are not distended, the external os, if found, should be punctured

with a trocar; if the os is not found, the trocar should penetrate well back. After that the procedure is the same as given in the preceding paragraph. If the occlusion is in a rudimentary horn beyond reach, the distended horn should be removed by abdominal section, or, if that is impossible, the ovaries and tubes be removed in order to abolish menstruation.

Rudimentary horn.

If the atresia is in the cervix of a divided uterus, the puncture is made beside the visible crescentic os.

Puncture.

22. When the accumulation is large and there is evidence of distention and adhesions of the tubes, it is better in the beginning to remove the adnexa by an abdominal section and evacuate from below at the same sitting. If that be impossible, the sac may be removed or stitched into the abdominal wound.

Remove adnexa and evacuate.

Sac.

23. **Treatment of Stenosis.** Adhesion of the labia in children can usually be separated by forcibly drawing them apart. If that is impossible an opening into the vagina can usually be found under the urethra, into which a curved sound can be introduced and the labia separated from within outward. In extreme cases a dissection can be made with the knife-handle down upon the sound.

Forcible traction.

From within outward.

Dissection.

A rigid hymen may be ruptured by the finger, or incised in several directions; if diseased, it should be excised and the raw labial and vaginal edges be stitched to each other.

Incision.

Excision.

Septa in the vagina can be incised with a blunt-pointed bistoury guided by the finger; or the perineum can be retracted, and they can be cut by the aid of a tenaculum and scissors. If the septa extend across the lumen of the vagina, a bent probe should be passed through their opening as a guide.

Incision of septa.

Tenaculum and scissors.

Probe.

An abnormally small vagina can usually be enlarged by tamponing it with wool or gauze, leaving the packing for thirty-six hours, and repeating the treatment twice or thrice

Tamponing vagina.

Repeated.

Increased.

weekly. At first a small tampon is used, and the size increased at each packing.

Dilation.

Stenosis of the cervix may be treated by gradual or rapid dilation (part I, chap. IV, par. 12 to 15).

CHAPTER VII.

CHLOROSIS (Green Sickness).

Deficient development.

Heart and arteries.

1. Chlorosis is a disease characterized in part by deficient development of the arterial and sexual systems. The heart and arteries are small and thin-walled, and as the child grows up and attempts to assume the active duties of life, are liable to undergo degenerative changes.

Blood.

Spleen.

Faulty function.

Inflammations.

The bloodmaking function is imperfect, the hemoglobin and, usually, the red corpuscles are deficient. The spleen is, as a rule, enlarged, and diminishes in size as the patient recovers. The secretions and excretions may be faulty, entailing more or less chronic toxemia, and rendering the patient more susceptible to local inflammations.

Puberty.

Complexion.

Indigestion, etc.

Powers of endurance.

Mental activity.

Cold weather.

Puberty is ordinarily delayed, and the manifestations of the disease are apt to be more pronounced about that time. The complexion assumes a yellowish or greenish hue, the flesh is puffy, and the muscular development shows a lack of vigor. Indigestion is common. Palpitation of the heart, listlessness, and other symptoms of anemia and debility are noticeable. The powers of endurance are feeble, although considerable mental activity, and even a taste for literary pursuits, may be developed. Cold weather often aggravates the symptoms (the winter chlorosis of Murri and Rosenbach).

Exercise.

2. The *treatment* consists in active but not violent outdoor

exercise, a limitation of mental labor, remedies to increase digestion and assimilation, plain but nourishing food, iron, arsenic, nux vomica, sponge baths, massage, calisthenics, etc. Mental rest. Digestives, tonics, etc.

Chlorotic girls should not be allowed to advance too fast at school, and should abstain from physical and mental activity during the menstrual period.

The prescriptions given in part 1, chap. V, par. 14, are serviceable; also the following:

℞.	Liq. potassii arsenitis, ...	ʒij, 8.00 gm.	
	Elixir peptenzyme, . . . ad . . .	f℥viij, 250.00 gm.	M.

Sig.—Two teaspoonfuls one hour after each meal, in water.

A teaspoonful of the syrup of iodid of iron after each meal is a favorite remedy with some gynecologists. When eructations of gas and abdominal bloating are troublesome, ten grains (0.66 gm.) of peptenzyme with five grains (0.33 gm.) of salol half an hour before each meal may be useful.

The administration of oxygen and of electricity are useful as tonics as well as stimulants to functional activity.

Massage, cold sponge baths, Swedish gymnastics, calisthenics, horseback riding, bicycling, and out-of-door occupations should be recommended, according to the condition of the patient. Exercise sufficient to produce exhaustion should not be allowed.

PART FOUR.

FUNCTIONAL AND NERVOUS DISEASES.

CHAPTER I.

PUBERTY, MENSTRUATION, AND THE MENOPAUSE.

Assume function. Age. Changes in organs. Voice. Fat. Menses.

1. **Puberty** signifies the stage of development of the sexual organs at which they are prepared to assume complete function. The age of puberty is usually between twelve and sixteen years. At this time the genital organs increase rapidly in size and vascularity. The mammary glands enlarge, the pelvis broadens, and hair begins to grow on the pubes. The voice softens in tone, fat tends to accumulate on the body, and the menstrual flow makes its appearance as the conclusive evidence of the approaching completion of the change.

The menstrual flow may begin as a normal, well-established flow that recurs monthly, or it may at first be scanty in amount, or may for a time recur at irregular, lengthened intervals.

Symptoms. Duration. Amount.

2. **Menstruation** has normally but few and slight symptoms. A feeling of heaviness about the pelvis, increased irritability of the pelvic organs, and some general nervous symptoms, are the most common. The flow lasts from two to six days. The amount passed varies from two to eight ounces (50 to 200 c.c.).

The condition necessary for the establishment of the normal menstrual flow must be a certain degree of general good health and development, and an adequate state of development of the sexual organs.

Cessation of function. Age.

3. The **menopause** signifies the cessation of active function of the sexual organs. The time of the menopause is usually

at about forty-five years or a little later. The genital organs decrease rapidly in size and vascularity, and their tissues become dense and rigid. The diminution and final disappearance of the menstrual flow is the most reliable evidence of the occurrence of these changes. Organs. Menses.

The menstrual flow may disappear suddenly, or may become less in amount each month, or may recur at less frequent, irregular intervals, once, twice, or many times, before entirely ceasing.

4. Normally the *symptoms* of the menopause are but slight, particularly if the flow stops by degrees, but may be pronounced if the flow stops suddenly. Leucorrhea may be present for a time. Nervous disturbances, indigestion, tympany, abdominal pains, diarrhea, intestinal congestion, or hemorrhage, and other symptoms such as might be due to reflex irritation or compensatory congestions are occasionally observed. Decided disturbances of the health at the menopause usually indicate pathological conditions of the pelvic organs. Normally slight. Leucorrhea. General symptoms. Pathological conditions.

5. The *treatment* of the symptoms attending the menopause consists mainly in the treatment of the pathological conditions upon which the symptoms depend. Pathological conditions.

When, however, the menstrual flow has been abundant and stops suddenly, the resulting disturbance may require a slight restriction in the diet and measures to stimulate the excretions, such as laxative and diuretic mineral waters, Turkish baths, massage, an increase in the amount of physical exercise, etc. A gram (15 grains) of bromid of sodium or of ammonium two or three times daily usually has a good effect upon the nervous symptoms. Irritability of temper and hysterical symptoms are usually benefited by asafetida and valerian. Sudden cessation. Diet. Secretions and excretions. Bromids.

6. During *pregnancy* and *lactation* the menstruation is absent, in the former during the whole term, and in the latter during the time in which the child receives all or nearly all of its nourishment from the breast. Menses, absent.

In a few exceptional instances menstruation seems to occur for two or three times after fecundation of the ovum, but, as a rule, the discharge is not at the proper time for menstruation, although often near it, and is merely an irregular hemorrhage from the lower portion of the uterus due to pathological changes therein.

Some women menstruate regularly during lactation ; others commence to menstruate after a few months ; and others do not menstruate until lactation has ceased, even though it continue a year or longer.

Rest.

7. On account of the unusual activity of tissue change in the sexual organs during menstruation the woman should abstain from all laborious or continuous occupation at such time. She should avoid cold baths or other unusual exposure, such as getting the feet wet, sitting in drafts of cold air, etc., for fear of increasing the local congestion and thereby originating pathological changes in the uterus or its appendages.

Avoid exposure, etc.

It is usual to wear a clean washed napkin to catch the discharge, and to change it as often as it becomes moderately soaked. This is pinned to the underclothes before and behind, or to an abdominal band.

Bleeding elsewhere.

8. *Vicarious menstruation* is the name given to a bloody discharge from some portion of the body, more often from the mucous membrane of the nose, which takes the place, in whole or in part, of the uterine discharge.

Physiological.

Pathological conditions.

Classifications.

9. Menstruation is a sign, or result, of physiological activity of the sexual organs, and disordered menstruation is symptomatic of pathological conditions either of the sexual or general system. Menstruation may be absent or diminished in quantity, excessive in quantity, or painful in character, giving rise to the terms *amenorrhea*, *menorrhagia*, and *dysmenorrhea*.

CHAPTER II.

AMENORRHEA.

1. Amenorrhea signifies, first, an entire absence of the menstrual flow, and is then called complete amenorrhea; secondly, a less than normal amount of the discharge or a less frequent return than normal, and is then called comparative amenorrhea.

Complete.

Comparative.

The term *primary amenorrhea* is used for cases in which the menses have never become properly established, *secondary amenorrhea* for those cases in which the menstrual flow has become established but has either completely or partially disappeared.

Definition.

2. Two conditions are necessary for the establishment and maintenance of menstruation:

Essentials.

(*a*) An adequate state of development of the sexual organs.

(*b*) A certain degree of nutrition and vigor of the general system.

3. The *causes* of amenorrhea are:

Classification of causes.

(*a*) *Absence or inadequate development* of the uterus or ovaries—usually congenital.

(*b*) *States of lowered vitality.* Among such are anemia, neurasthenia, tuberculosis, and different forms of blood poisoning, whether from animal, vegetable, or chemical substances or products.

Attacks of fever, unhealthy modes of living, sea voyages, organic disease of the vital organs, and the like, bring about such states. Obesity and plethora may indirectly or collaterally act as causes. Pregnancy is also a cause.

(*c*) *Diseases of the genital organs*, such as chronic metritis, chronic ovaritis, acute or chronic inflammation involving the pelvic peritoneum and connective tissue, premature atrophy of the uterus or ovaries, long-standing subinvolution, hyperinvolution, large tumors, malignant disease, etc.

(*d*) *Removal or mutilation* of the uterus or ovaries by operation, or as the effect of injury.

Removal of the muscularis mucosæ by a sharp curette too vigorously used, or by cauterization, may act in this way.

The non-appearance of the menses due to retention within the uterus and vagina belongs to the subject of atresia of the genital organs, not to amenorrhea (part 3).

Congenital or otherwise. No symptoms. General deficiency. Internal organs.

4. **Primary Amenorrhea.** In the *diagnosis* of primary amenorrhea it is important to determine whether the condition be congenital or the result of causes acting during childhood or girlhood. When it is congenital there are no symptoms connected with it, and there may or may not be evidence of general deficiency in development, particularly of the mammary and pubic regions. An examination reveals the absence or abnormality of the internal sexual organs.

General symptoms. Anemia and neurasthenia. Pelvic symptoms.

5. The general symptoms alone are often sufficient to indicate the character of the trouble. Anemic and neurasthenic girls, or those with a recognizable disease that reduces their vitality, and without signs or symptoms of pelvic disease, should be treated for those conditions before undergoing an examination. When there is no anemia or sign of profound debility, and there are decided symptoms referable to the pelvic organs, an examination becomes necessary.

Not for bloody flow. Restore normal conditions.

6. *Remedies* must not be given merely for the purpose of producing uterine congestion and a bloody discharge, but rather for the purpose of restoring those conditions of the general system and of the uterus which are necessary to normal menstruation.

Not amenable. General health.

7. The congenital cases are, as a rule, not amenable to treatment. Cases of inadequate development either of the genital or general system may, in young subjects, be benefited by prolonged efforts directed to the improvement of

the general health and vigor, and occasionally by local stimulation. When the uterus and ovaries are slightly undersized intra-uterine bipolar faradism (part I, chap. V, par. 5) and occasional dilation of the cervix are often successful in producing a bloody flow, and sometimes in promoting the development of undersized organs. Local stimulation. Bipolar faradism.

The administration of potassium permanganate, aloes, transy, myrrh, savine, etc., is seldom advisable, since they do but little good, and are capable of doing harm.

8. Amenorrhea due to conditions of lowered vitality calls for the use of general tonics and the inauguration of hygienic regulations. Iron, phosphorus, nux vomica, cod-liver oil and the bitter tonics are the most useful medicines. (See part I, chap. V, par. 11 to 14.) Tonics. Hygiene. Iron, etc.

When there are indications of an attempt at menstruation, such as pelvic pains, or a slight bloody discharge, it is well to favor the attempt by giving hot drinks, sitzbaths at a temperature of 100° F., vaginal douches (temp. 105° F.), and hot fomentations over the abdomen. Aloes, tansy, potassium permanganate, and like remedies, should not be given.

9. **Secondary or Acquired Amenorrhea.** The *diagnosis* may or may not require a physical examination, as explained in the diagnosis of *primary* amenorrhea (par. 5). When there is no anemia or sign of profound debility, and the menses, after having been perfectly regular, have suddenly remained away without accompanying symptoms, pregnancy may be suspected. The symptoms of pregnancy should then be inquired after, and possibly an examination be made. Examination. Suspected pregnancy. Symptoms. Examination.

It should be borne in mind that amenorrhea *frequently* follows conditions of lowered vitality in virgins, only *occasionally* in married nullipars, and but *seldom* in women who have borne children.

10. The *prognosis* is serious or not, according to the pathological conditions causing it. In young virgins it is Varies. Virgins.

Parous women. more often favorable than in child-bearing women, since it may be caused by slighter ailments in the former.

Etiological conditions. 11. The *treatment* must be directed not so much to the reproduction of the flow as to the pathological condition upon which the amenorrhea depends (par. 3). As the flow has been previously established, it may be expected to return when the proper conditions for it are brought about.

Definition. 12. **Suppression of the Menses.** By suppression of the menses is meant a sudden stoppage of the flow during a monthly period, or its suppression by causes working just at or before the beginning of the period. Congestion. The congestion of menstruation has occurred, but the flow necessary to relieve that congestion is either insufficient for the purpose or does not take place.

Disturbed circulation. 13. The *cause* of acute suppression is a disturbance of the circulation from exposure to cold or over-exertion, or from irritation due to other pelvic disease.

Excessive or prolonged mental emotion, or shock, may temporarily suppress the menses, but as this form is merely a part of a general suppression of function, it requires no separate treatment, and hence no separate consideration here.

Congestion. 14. The *pathological condition* is that of uterine and ovarian congestion, followed, unless promptly relieved by an establishment of the flow, Inflammation. by inflammation of the uterus and sometimes of the ovaries.

15. The *symptoms* are those belonging to uterine congestion Pain. Bearing down. and inflammation, such as pain in the lumbar, sacral, iliac, and Vesical region. vesical regions, bearing-down sensations in the pelvis, frequent Temp. and pulse. desire to urinate, a moderate rise of the temperature, an Headache, etc. unusually full or else a quick pulse, and perhaps some headache and general disturbances of function.

These symptoms appear at the regular time of the flow or after the flow has commenced and stopped, and in patients who before have had a normal or nearly normal amount each month.

Time. Immediate treatment. Inflammation.

16. The *prognosis* is bad in proportion as time has elapsed since the commencement of the symptoms. Treatment instituted immediately will often start the flow and relieve the congestion. If the flow can not be reëstablished before the time of the menstrual period is over, uterine inflammation may be expected to follow.

Flow. Equalize circulation. Sitzbath, etc. Fomentations. Saline. Later tonics, etc.

17. The *treatment* should at first be directed to the reëstablishment of the flow. To bring back the circulation to its natural channels is the most important means to this end. Warm sitzbaths (temp. 100° F.), mustard foot-baths and hot drinks should be employed as soon as possible. The patient should then go to bed and use hot fomentations to the abdomen and inside of thighs for several hours. Two gm. (30 grains) of sodium citrate every three hours and a saline cathartic are helpful. After the time for the period has passed, tonics, restriction of exercise, counterirritation over the iliac regions, warm sitzbaths, hot douches, and other means adapted to the relief of uterine congestion and inflammation should be used.

In case the patient is married or has previously had a vaginal examination, the application of two or three leeches or a thorough scarification of the cervix would be indicated to diminish the uterine congestion, particularly if the above-mentioned remedies do not reproduce the flow within twelve or fifteen hours. At the next menstrual period the same means should be employed to reproduce it as were employed the month before.

CHAPTER III.

MENORRHAGIA AND METRORRHAGIA.

Definition.

1. *Menorrhagia* signifies the loss of an abnormally large amount of menstrual fluid. *Metrorrhagia* signifies a hemorrhage from the uterus either at or between the regular times

Restriction. for the menses, but is usually restricted to that which occurs between the periods.

As the normal amount varies in different women, the standard for each woman may be considered the amount she habitually lost when a nullipar, and in good health.

Two kinds. 2. The *causes* may be divided into local and general.

Enumeration of local. (*a*) Local. The most common local causes of menorrhagia are endometritis, intra-uterine polypi, subinvolution, inflammation of the Fallopian tubes, ovaries, and pelvic peritoneum, accumulations of pus in the pelvis, intra-uterine neoplasms, interstitial uterine fibroids, ovarian tumors, uterine displacements, and various diseases of the pelvic and abdominal viscera. They may also cause metrorrhagia.

Malignant disease of the uterus, erosion of the cervix, retained secundines after abortion or labor, pelvic hematocele, extra-uterine pregnancy, "threatened abortion," and placenta previa, produce metrorrhagia.

Enumeration of general. (*b*) General. The most common general causes of both are excitement, over-exertion or exposure at, or just before, the beginning of the period, altered conditions of the blood due to contagious, infectious, malarial or other septic affections. Chemical poisons introduced into the system, or due to disease of the kidneys and liver, hypertrophy of the heart, and rapidly supervening plethora are occasional causes.

Of etiological conditions. 3. A *diagnosis* of such of the above-mentioned pathological conditions as cause the menorrhagia or metrorrhagia must be made in order that its nature may be understood.

According to cause. 4. The *prognosis* is favorable or not, according to the curability of the cause. Variations. Sometimes the bloody flow will last during the whole of the intermenstrual period, but as a rule it may be checked; yet it is liable to continue to recur until the cause is removed. Death. Exceptionally, death results directly from the hemorrhage. Anemia. In other instances the anemia becomes so profound after the long-continued recurrence of the affection that the patient finally succumbs from inanition or some trivial intercurrent affection. Inanition. Intercurrent affection.

5. The *treatment*, first of all, calls for the cure or relief of the pathological condition upon which the affection depends. Etiological conditions.

The treatment of the attack requires that the patient be immediately put to bed and kept quiet. Put to bed. Cool, acidulated drinks should be given, and all hot drinks or local applications avoided. Drinks. In cases not dependent upon acute inflammatory conditions, half-teaspoonful doses of the fluid extract of ergot every half-hour or so is one of the most useful remedies. Ergot. Sometimes half-teaspoonful doses of aromatic sulphuric acid, well diluted, given every two or four hours, according to its toleration by the gastric mucous membrane, is helpful. Sulphuric acid. Half-gram doses (eight grains) of gallic acid every two hours are often used. Gallic acid. Half-teaspoonful doses of the fluid extract of hydrastis canadensis four times daily is a slow but sometimes efficient remedy. Hydrastis.

Frequent vaginal douches, taken at a temperature of 110 or 120° F., often stop the flow after it has commenced to subside. Hot douches.

When the above-mentioned means fail, an ice-bag may be placed on the abdomen and kept there for twelve or twenty-four hours, with care that the cold is continuously applied. Ice-bag. Cold vaginal douches and the introduction of ice into the vagina may be used in extreme cases. Cold douches.

If the case be urgent, and other means fail, or if there be no time for delay, the vagina may be immediately packed with sponges or cotton pledgets that have been compressed and dried after having been soaked in a saturated solution of alum or weak solution of ferric sulphate (W. H. Byford). Vaginal tampon soaked in astringent solution. They should be changed every twenty-four hours. Changed. This failing, a sponge-tent in the cervix may be used with each packing, or the uterus and vagina may be packed with iodoform gauze, Sponge-tent. Iodoform gauze, etc.

squeezed out of diluted tincture of ferric chlorid or tincture of iodin (1 : 4), or out of boiled vinegar.

Curettage. Should there be an intra-uterine growth or inflammatory product, a curettage would be called for.

The milder remedies, such as the vegetable and mineral astringents, cinnamon, hamamelis, atropin, cannabis indica, strychnin, quinin, etc., have much less effect than those mentioned above. Opium in full doses sometimes acts well as an adjuvant. Great care must be taken, in replacing the intra-uterine gauze or the sponge-tent within the cervix, to precede it with an antiseptic vaginal and intra-uterine douche, or else disastrous effects may follow.

Sponges for vaginal tamponade may be prepared by soaking them for an hour in a saturated solution of alum in water, or in Monsel's solution diluted with equal parts of water, and then squeezing out the solution and wrapping twine or tape around them in such a manner as to compress them into cylindrical or other convenient shape for introduction into the vagina. When they are dry the cord or tape is removed and all rough projections shaved off. The vagina should be filled with them.

In packing the vagina with gauze or small pledgets of cotton or wool, the material should be so placed as to leave no space through which the blood can trickle (part I, chap. IV, par. 11).

6. The *treatment* must sometimes be continued *between periods*. Iron. Iron may be required to relieve the anemia, and the Ergot. fluid extract of ergot can, in cases of subinvolution, fibroid tumor, etc., be given for months in doses of half or one-third of a teaspoonful three times daily. Digitalis, etc. Digitalis, strychnin, and quinin may be used to correct conditions outside of the uterus and to give tone to the uterine tissues. Electro-cauterization. Repeated cauterization of the endometrium by means of the positive electrode, or twice monthly with a 33 per cent. solution of zinc chloride, are efficient remedies in cases dependent upon vascular conditions of the endometrium. Repeated curettage. Curettage must sometimes be repeated two or three times to cure the endometritis.

Gehrung has discovered that tamponing the vagina during each monthly period will prevent the loss of a large amount of blood without doing injury. This may be resorted to in cases of anemic patients with persistent moderate menorrhagia.

CHAPTER IV.

DYSMENORRHEA.

1. Dysmenorrhea signifies painful menstruation. Definition.

The pain may commence at any time from a week before the appearance of the flow to its disappearance, and may stop any time from the beginning of the flow to the week after it. Onset and cessation of pain. It may last from an hour to two weeks, and vary in different cases with regard to its location and intensity. Duration, etc.

2. It is convenient to divide dysmenorrhea into four varieties, indicative of the pathological conditions upon which it depends. Varieties. Thus we have:

Neuralgic dysmenorrhea.

Inflammatory or congestive dysmenorrhea.

Mechanical dysmenorrhea.

Membranous dysmenorrhea.

Some cases represent a mixed type. Ovarian dysmenorrhea is sometimes described as a distinct variety, but according to our present state of knowledge, it can not be said to deserve recognition separate from the inflammatory or congestive.

3. **Neuralgic Dysmenorrhea.** Neuralgic dysmenorrhea is *caused* by general rather than local pathological conditions, General conditions. and usually occurs in patients of a neuralgic or rheumatic diathesis. Diathesis.

Anemia, hysteria, neurasthenia, indigestion, and other conditions of perverted and imperfect functions are apt to be associated with this form of dysmenorrhea.

4. The *pain* appears to be independent of the character or amount of the flow. Independent. It may appear and be most intense either before, during, or after the flow, or may come and go during the whole of the time. Variability. It may be slight or may be excruciating. It varies at different monthly periods with re-

Pains between the periods. gard to its advent, duration, and intensity. Neuralgic or rheumatic pains are apt to be felt in the intermenstrual period either in the pelvis or elsewhere.

Location. The pain radiates from the uterine region to the iliac, abdominal, lumbar, or sacral regions, and sometimes down the limbs.

Neuralgic. It is of a neuralgic nature, and frequently seems to be made more intolerable by the nervous state of the patient. Hyperesthesia. Hyperesthesia over the lower abdomen and spine are often noticeable.

No cause in pelvis. 5. The *diagnosis* is based upon the absence of sufficient Irregularity. pelvic disease to cause the trouble, upon the irregular, undulating character of the pain, and upon the presence of a neu- Condition. ralgic, rheumatic or neurasthenic condition.

Slow. 6. The affection is often very slow to yield to treatment, Return. and quite apt to return, but may usually be cured, or at least Time. alleviated, in time.

General condition. 7. The *treatment* must be directed to the condition of the patient rather than to that of the pelvic organs. If there be Rheumatism. evidence of rheumatism, that should be faithfully treated. In Anemia and neurasthenia. anemic and neurasthenic cases, tonics, such as iron, nux vomica, phosphorus, quinin, cod-liver oil, and the hypophos- Tonics. phites, should be persistently used. Exercise. Out-door exercise, the Rest cure. Weir Mitchell rest treatment, a simplified but hearty diet, and Climate. particularly a change of climate, have been found to be of Bowels. great benefit. The bowels should be moved freely just before Phenacetin, etc. the pain is to be expected. A gm. (gr. 15) of phenacetin or antipyrin, mixed with a grain of caffein, repeated in two hours if necessary, often affords relief. One or two full doses of Chloral and opium. chloral hydrate, or of an opiate, may be required in some cases.

From half to one teaspoonful of the ammoniated tincture of guaiac three times daily, or as much as can be taken without causing disorder of the stomach or bowels, will help in some cases; in others, 0.50 c.c.

(8 minims) of the wine of colchicum seed with half a teaspoonful of the tincture of cimicifuga; in others half a gram (8 grains) of sodium salicylate every two hours may be tried. One of the first two may be given for two weeks before the expected paroxysm, or the last for three or four days before it. In plethoric patients a quarter of a gram (4 grains) of blue mass every night or two, until one or two grams (15 to 30 grains) have been taken, exerts a marked influence, particularly if the diet be well regulated, and medicines be given to relieve such gastric and intestinal disorders as may be present.

On the other hand, we must avoid giving debilitating remedies to patients whose vitality is already below par. Tonics and other measures to invigorate the system must then take precedence.

8. **Inflammatory or Congestive Dysmenorrhea.** Inflammatory dysmenorrhea is the result of inflammation or congestion within the pelvis. The endometrium is, as a rule, either primarily or secondarily in a state of inflammation or congestion. Catching cold, overexertion, or intestinal disorder sometimes brings on the trouble, or increases its severity, in patients who already have inflammatory pelvic diseases.

Inflammation.

Endometrium.

Catching cold, etc.

The principal pathological conditions are endometritis, subinvolution, salpingitis, ovaritis, chronic pelvic peritonitis and its residue, parametritis, accumulations of pus in the pelvis, submucous, uterine fibroids, and uterine displacements.

9. The *pain* is that of inflammation, and is felt as a soreness, burning or throbbing in the pelvis or lower part of the back that may radiate up the spine, down the limbs, or into the iliac or pelvic region. When the pain is due to uterine inflammation, it commences with the flow or as soon as it becomes well established, and may continue while the flow lasts.

Kind of pain.

Location.

Uterine inflammation.

An excessive or premature flow tends to relieve the pain. Sometimes the pain is paroxysmal, simulating those of mechanical dysmenorrhea, and is due to uterine contractions, which are supposed to occur during normal menstruation, but which are not painful unless there be endometritis or stenosis. (Handfield Jones.)

Excessive flow.

Paroxysmal.

Why painful.

When the inflammation is located in the ovaries the pain

Onset and cessation. usually commences several days before the flow does, and sometimes, but not always, ceases as soon as the flow is well established. Radiates. It radiates from one or both iliac regions up or down the sides of the body or into the gluteal region or thigh. Scantiness. The flow is often rather scanty.

Headache, etc. Headache, nausea, nervous irritability, and some febrile reaction are present in most cases. Intermenstrual. In the intermenstrual period the patient exhibits the signs and symptoms of some form of pelvic inflammation.

Nature of pain. 10. The *diagnosis* is made from the nature of the pain, and Inflammation. the fact that the signs and symptoms of the pelvic inflammation or congestion are present between the periods. Unless Early history. the condition exists in connection with the mechanical variety, there will usually have been a longer or shorter period in the patient's early menstrual life in which menstruation was painless.

11. The *prognosis* is favorable, but the time required for a Cure slow. cure is often long, and depends upon the character of the inflammation.

Cure the inflammation. 12. The *treatment*, of course, calls for the cure of the inflammation, which will be described elsewhere.

Something may, however, be done to relieve the pain and thus benefit the dysmenorrhea before the radical cure is Bowels. effected. The bowels should be moved freely by salines just In bed. before the attack, and the patient be put to bed and kept warm. In severe cases the abstraction of blood from the Scarification. cervix by scarification the day before the appearance of the flow has an ameliorating influence. When the attack is pre- As for acute suppression. cipitated and made worse by taking cold or by over-exertion, and the flow is not free, the treatment recommended for acute suppression of the menses may be employed. In most cases Counter-irritation. counterirritation over the lower abdomen by means of turpentine stupes, followed by hot fomentations, alleviates the pain somewhat.

13. **Mechanical Dysmenorrhea.** Mechanical dysmenorrhea depends upon some mechanical impediment to the function of menstruation. This impediment may be such as to prevent or interfere with the escape of the flow, or it may interfere with the normal menstrual congestion and erection of the uterus.

Mechanical impediment.
Acts in two ways.

The escape of the discharge is rendered painful by stenosis of the external or internal os uteri, vagina, or hymen, by acute flexions, pressure of tumors situated within the cervical or lower uterine walls, or by a polypus obstructing the os.

Stenosis.
Flexions, tumors, polypus, etc.

The monthly congestion of the uterus is rendered painful by imperfect development of the whole uterus or of the cervix, or by atrophy of one of the walls due to long-standing flexion or previous inflammation, or by extreme retroflexion or retroversion of a flabby uterus. There is usually an accompanying endometritis in old cases. In either case the worst suffering is caused by painful uterine contractions.

Imperfect development.
Atrophy.
Displacements.
Endometritis.
Contractions.

14. The trouble has, as a rule, existed from the first, or almost the first, menstrual period. In young people the pain ordinarily commences a few hours before the flow and ceases as soon as the flow is established, and no pelvic discomfort is felt until a few hours before the next period. When due, however, to imperfect development of the uterus, or acute retroflexions or retroversions, it may persist nearly as long as the flow lasts.

From first period.
Onset of flow.
May persist.

The pain is paroxysmal in character, and when very severe may be attended by nausea. It radiates from the uterine region through the lower abdomen and inguinal region, and in a few minutes is followed by complete relief, which lasts from a fraction of an hour to an hour or two. With the subsidence of the pain an increase of the flow may be noticed.

Paroxysmal.
Nausea.
Location.
Relief.
Increased flow.

When this form of dysmenorrhea has lasted for several years it becomes complicated with the inflammatory variety. The pain is then paroxysmal, but it continues for some time after the flow has commenced, and is complicated by the pain of inflammation. The pain may be so severe in such cases that the patient has to keep her bed for several days.

Paroxysmal. Time. Flow. Absent between periods. Since first period.

15. The *diagnosis* is based upon the paroxysmal character of the pain, the time of its commencement and cessation, the increased flow that often appears when the paroxysm subsides, the freedom from uterine symptoms between the periods, and in some cases by the fact that it has been there from almost the first menstrual period.

Full development. Defective. Inflammation.

16. The *prognosis* is good in cases in which the uterus is quite well developed, but almost always hopeless in those in which the uterus is defective in development. The prognosis is rendered more unfavorable by the supervention of inflammation.

Forcible dilation. Dilation with sounds. Develop cervix.

17. *Treatment.* When the obstruction is due to uterine flexion, it is to be treated by forcible dilation, according to directions given elsewhere (part 7, chap. VIII, par. 15). When it is due to the small size of the cervix or uterus, the cervix may be dilated with graduated metal sounds or bougies, and kept dilated by the passage, twice weekly, of a sound equal to a No. 12 or 15 catheter (Fig. 21). This, if continued for many months, will do much to develop the cervix, and generally be followed by permanent relief.

Packing.

Vulliet's method of keeping the uterus packed with iodoform cotton pledgets or iodoform gauze strips for several weeks, changing the packing and increasing the amount each day, helps to develop while it dilates the uterus (part I, chap. IV, par. 15).

Faradism. Stimulate. Develop.

Faradic electricity, applied by means of vaginal or intra-uterine bipolar electrode, and in such a manner as to stimulate the uterus, has a slight effect in developing it (part I, chap. V, par. 5).

The intra-uterine steam pessary has been worn with benefit, but is now almost universally condemned on account of the danger of septic infection.

When inflammation complicates the stenosis or deformity of the uterus, curetting should accompany a forcible dilation for flexion. Intra-uterine applications should be used after each passage of the uterine sound. The antiseptic precautions given in part I, chap I, par. 31, for the passage of the uterine sound must be strictly observed in using the bougie.

The application to the endometrium of 20 to 50 milliampères of galvanic electricity by means of the negative pole has proved efficient in the hands of Laphorn Smith.

When the cervix is quite small a tapering bougie can be whittled out of slippery-elm bark, which, after being moistened in a 5 per cent. solution of carbolic acid, can be slightly mashed and bent between forceps and dilator and then be introduced and left in place for a few minutes (Fig. 47). After dilating in this way for a few times, a moderate-sized male steel urethral sound or flexible bougie may be used instead. (See part 3, chap. III, par. 18.)

18. For the relief of the pain, hot fomentations, turpentine stupes, and hot drinks are sometimes sufficient. Alcoholic stimulants, ginger or other aromatics are often given in hot water with marked benefit. One or two full doses of belladonna sometimes act beneficially. **Hot applications and drinks.** **Stimulants.** **Belladonna.**

Alcohol and opium should not be given in ordinary cases, on account of the danger of establishing a habit. Phenacetin and antipyrin (one gram, 15 gr.) afford relief in ordinary cases and are preferable.

19. **Membranous Dysmenorrhea.** Membranous dysmenorrhea is that variety in which the paroxysm terminates in the expulsion of a membrane from the uterus. It may pass as a complete cast of the uterus or in membranous shreds. It has the characteristic formation of uterine mucous membrane, the blood-vessels, glandular openings, and interglandular substance being, however, increased in size and amount. It is thrown off as the result of hemorrhage underneath the surface (Fritsch) which can not escape through the epithelium, usually in connection with interstitial metritis (Gottschalk) that apparently takes on an acute character at each period. **Description.** **Membrane.** **Appearance.** **Formation.** **Hemorrhage.** **Metritis.** **Acute.**

Onset. Paroxysmal. 20. The *pain* commences with the flow, comes on in paroxysms, as in mechanical dysmenorrhea, and increases in Like labor pains. severity until it finally resembles labor pains. After a few Membrane shed. hours or days the membrane is shed and the pain ceases to return. Free flow. This is commonly followed by a free flow of blood for a short time.

The pain in most cases is excruciating, and the effect upon the health of the patient quite disastrous, being increased by the large amount of anodynes she is obliged to take for relief.

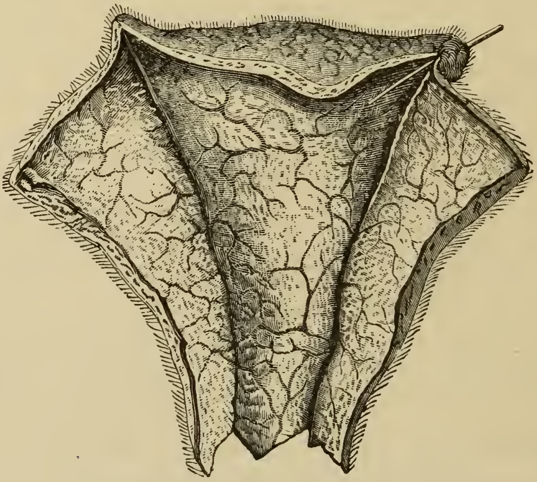


FIG. 111.—A DYSMENORRHEAL MEMBRANE LAID OPEN. (*Coste.*)

Membrane. 21. The *diagnosis* depends upon the discovery of the characteristic membrane in the discharge. The signs and symptoms of both mechanical and inflammatory dysmenorrhea are Mechanical and inflammatory. also present.

22. The *prognosis* is usually favorable, although the cure is a long and difficult one.

23. The *treatment* must be directed to the cure of the Repeated curettage. uterine inflammation. Repeated dilation and curettage of the uterus has given the best results.

The treatment of the paroxysm consists in giving opiates or anesthetics, together with hot drinks, hot local applications, and turpentine stupes over the abdomen. Opiates or anesthetics. Local.

24. In some cases of dysmenorrhea of mixed origin all treatment will fail to be of benefit, and it may become necessary to remove either the uterus or ovaries in order to save the patient from a life of invalidism and a premature death. Removal.

CHAPTER V.

STERILITY.

1. Sterility or barrenness in woman signifies an inability to bring forth a living, viable offspring. Definition.

There are three kinds of sterile women, viz. : those who are past the age of puberty, but have never been able to conceive ; those who have conceived but, although not beyond the menopause, are no longer able to ; and those who conceive, but are still unable to bring forth a living, viable offspring. Varieties.

The three conditions necessary for successful impregnation are : Conditions of impregnation.

1. Normal ovulation.
2. Contact of a normal ovum with normal spermatozoa.
3. Capability of the uterus for the development of the impregnated ovum.

2. The **causes** may be general or local. Classification of general.

The general causes are,

(*a*) *A lowered state of the general vitality* from disease, starvation, excessive "wear and tear" of the system, etc.

(*b*) *A depressed state of the nervous system* suspending the function of ovulation, such as misfortune, prolonged grief, neurasthenia, etc.

(*c*) *Disordered states of the system* interfering with the functions of the body, such as gout, rheumatism, excessive obesity, etc.

Classification of local.

The local causes are,

(*a*) *Absence or deficient development* of some portion of the genital tract.

(*b*) *Stenosis* of some portion of the genital canal.

(*c*) *Displacement or malformation* of one or more of the genital organs, such as acute uterine flexions, or displacements by tumors, elongated cervix, imperforate hymen, etc.

(*d*) *Disease of the genital organs*, such as the different forms of inflammations of the vagina, uterus, Fallopian tube and ovaries, hyperinvolution, degeneration and premature atrophy of the ovaries, accumulations of pus in the pelvis, etc.

(*e*) Tumors, carcinoma, sarcoma, papilloma, uterine polypi, genital tuberculosis, and other kinds of infection localized in the pelvis.

A thick plug of mucus in the cervical canal is supposed to act as a mechanical cause of sterility, but in such cases I have usually found sufficient inflammation either of the uterus or its adnexa to prevent successful conception.

3. The **diagnosis** consists in the discovery of the conditions that prevent conception or interrupt the course of pregnancy.

When the patient has never menstruated, the condition is apt to be one of absence, or deficient development or atresia of the organs. When she has always had pain just before, or at the beginning of the menstrual period, we usually find cervical stenosis with anteflexion, deficient development, or some other displacement or malformation of the uterus. If the patient has borne children, or menstruates without the initiatory pain, inflammation or some other local disease should be looked for.

The possibility of impotency in the husband must not be overlooked. It is present in from five to ten per cent. of cases.

4. The **prognosis** depends upon the curability of the cause.

Absence or deficient development of the genitals usually affords a hopeless prognosis. Stenosis and displacement affect the prognosis unfavorably in proportion as they are of long standing, women under twenty-five years being often cured of their sterility, those over thirty but seldom. The diseases of the genital organs are often all cured, or supposed to be cured, without removing the sterility that seems to be caused by them.

5. The **treatment** consists in removing all of the conditions upon which the sterility depends, and will be found in the chapters devoted to these subjects. Etiological conditions.

States of general debility and depression should be remedied. General conditions. The cervix, if small or malformed, should be kept Cervix. dilated as well as possible, and displacements of the uterus Displacements. should be corrected as is directed elsewhere.

The intra-uterine stem pessary has been known to cure some cases of sterility. Outerbridge's intra-uterine speculum has accomplished similar results. These instruments must usually be worn several weeks or even months, and are liable to become the source of uterine infection. Dilation twice a week by means of uterine sounds is about as efficient and is a less dangerous, although in the beginning a somewhat more painful, method.

CHAPTER VI.

DISORDERS OF THE SEXUAL RELATION.

(*Anaphrodisia*, *Nymphomania*, *Perversion*, *Dispareunia.*)

1. A normal condition of the sexual system presupposes a certain amount of sexual excitability. Sexual excitability. This excitability may be either entirely absent, abnormally developed, or Variations. perverted.

2. **Anaphrodisia.** The normal excitability may never have Varieties. been developed or it may be suppressed.

When it has *never been developed* its absence depends upon an imperfect development or deformity of the sexual organs, Sexual organs.

Nervous and vascular systems. or upon a delayed, arrested or perverted development of the nervous and vascular systems.

Part third. Hygiene. In the former case the local condition should be treated as recommended in part third. In the latter a change of habits from sedentary to active out-door occupations, or from excessive and exhaustive occupations to lighter ones. Massage, electricity, abundant feeding, amusements, and other means that may be indicated to restore the system to a healthy, active condition should be employed. Strychnia, phosphorus, and iron are the most useful drugs. Restore general health.

Incurable. In some women no cause can be discovered, and no remedies seem to alter the condition.

Exhaustion. Indulgence. Debility. Disease. 3. *Suppression* of sexual excitability may be due to an exhaustion of the sexual nervous centers from excessive indulgence, to impairment of nervous function from debility, and to disease of the sexual, nervous, or general system.

Temporary abstinence. Restore health. The treatment consists in the temporary avoidance of the sexual relations, and the employment of means to restore the health and vigor of the patient.

Among the causes may be specified debilitating diseases, hemorrhages, misfortunes, mental anxieties, neurasthenia, hysteria, melancholia, chronic pelvic inflammations, organic diseases of the nervous system, conjugal incompatibility, etc.

Abnormal excitability. All ages. Causes. Predisposing. 4. **Nymphomania**, or an abnormal development of sexual excitability, occasionally affects children and old people as well as menstruating women. It is usually the result of masturbation or frequent indulgence. The original or predisposing causes may be mental (erotomania), spinal disease, idiocy, inherited tendencies, local irritations or diseases. Auxiliary. Among auxiliary causes may be mentioned overeating, indolent habits, improper reading or conversation, and false notions as to supposed benefits of sexual indulgence.

Cause. Habit. Watching. 5. The *treatment* consists in removing the cause and in breaking up the habit of indulgence. Constant watching and prevention of overindulgence are often necessary. The patient must be taught the harmfulness of the habit and convinced of the possibility of restraint. Constant occupation, Turkish baths, sponge baths, tepid sitzbaths, change of associations, journeys to a cold climate, etc., are useful. Bromid of potassium in 15 grain (one gm.) doses three or four times daily is a good remedy for temporary use.

Teaching.

Occupation, baths, etc.

Bromid.

Clitoridectomy and oophorectomy have been tried and have failed to effect a cure, and are only indicated when incurable disease of the external genitals or ovaries respectively perpetuate the condition. When the clitoris is amputated the nymphæ should also be removed. The perineum and even the anal region may become the starting places of sexual excitement.

6. **Perverted sexual excitability** and the indulgence in unnatural practices seem to act more disastrously on the health of women than on men, by increasing pelvic congestion and aggravating diseased conditions already present. All unnatural forms of coitus or sexual excitement must be prohibited.

Disastrous.

7. **Dyspareunia** is a symptom of various diseases. Organic disease, deformity, maldevelopment, cicatricial contraction, or displacement of any of the genital organs, genital neuroses, such as hyperesthesia, vaginismus, and hysteria, trauma, urethritis, cystitis, vesical calculus, rectitis, anal fissure, hyperinvolution, premature senility, cicatrices, pelvic tumors, want of proportion between the male and female organs, roughness on the part of the husband, etc., may give rise to the complaint.

Symptom.

Enumeration of causes.

The *treatment* consists in removing the cause. Smallness of the vagina can often be relieved by packing the vagina two or three times weekly with borated cotton and leaving it for thirty-six hours each time, or by the use of the ordinary glycerin and wool tampons (part I, chap. IV, par. 9).

Remove cause.

Packing vagina.

Glycerin tampons.

CHAPTER VII.

HYPERESTHESIA AND VAGINISMUS.

Definition.

1. **Hyperesthesia** of the pelvic organs consists of an abnormal sensitiveness of the pelvic viscera, lower abdomen, and sometimes of the tissues about the coccyx.

Hymen. Imperfect development. No lesion.

Inflammation or cicatricial tissue about the hymen, inflammation or imperfect development of the ovaries or other sexual organs, or even no appreciable local lesion, may be present. There is often hysteria, neurasthenia, or spinal irritation, or a condition of the nervous system bordering on these affections.

General and nervous conditions.

If the patient knows that she has local disease in the pelvis, the hyperesthesia is apt to be made worse, or may even be developed, by that knowledge, although the local disease may have little or no effect in producing hyperesthesia.

Pain in coitus or examination.

2. The chief *symptom* is a complaint of pain upon an attempt at introduction of the male organ or upon digital or manual examination either of the vagina or lower abdomen. By proceeding very slowly, however, and diverting the patient's attention from the examination, quite firm pressure may be made within the vagina or upon the abdomen without pain, although great pain may have apparently been produced by the first contact. Coitus is in some cases tolerated, in others not at all.

Gradual firm pressure.

Coitus.

Pathological conditions. Local applications.

3. The *treatment* consists first in removing the pathological conditions and in making local applications to diminish the sensitiveness of the superficial nerves. For the latter purpose a piece of cotton saturated with glycerin may be introduced through a small speculum and left for thirty-six hours. In two or three days a still larger one, and so on until the parts become accustomed to the presence of a foreign body. The

Glycerin tampon.

Increase size.

Stretching.

speculum should be expanded sufficiently to gently stretch the vagina each time it is introduced.

Douches.

Stimulating and antiseptic vaginal douches, such as a one per cent. solution of carbolic acid, 1 : 4000 of corrosive mercuric chlorid, or of potassium permanganate, should be used twice daily while the tampons are not in the vagina.

Carbolic acid, etc.

Ulcerations may be touched with strong carbolic acid or a ten per cent. solution of nitrate of silver once a week.

Gentleness.
Convince patient.

The manipulations should be gentle, and the patient must be convinced that she can tolerate them, since the suffering is largely mental and imaginary.

General condition.

The general treatment consists in such remedies as are appropriate for hysteric, neurasthenic, and debilitated conditions, and must be determined by the particular manifestations in each case.

Hyperesthesia.
Painful contraction.
Burning, etc., between.

4. **Vaginismus** consists of hyperesthesia of the vulvo-vaginal orifice and neighboring parts accompanied by spasmodic painful contraction of the perineal muscles. Burning, itching, and bearing-down sensations are in some cases felt between the attacks of spasm.

Exciting cause.
Before contact.
Extent of contraction.
Anesthesia.

The spasm is produced by attempts at coitus, digital examinations, douching, etc., and the mental condition is often such that the spasm occurs before the parts are touched. In extreme cases not only are the vaginal entrance, the anus, and urethra tightly closed, but the muscles of the thighs are contracted, and the conditions resemble an attack of convulsions. Under anesthesia the parts remain relaxed, and an examination can easily be made.

Lesion of hymen.
Vulva, etc.

The source of irritation is most frequently an inflamed, fissured, or ulcerated condition of the remains of the hymen, although the lesion may be about the vulva, anus, or urethra.

General health.
Newly married.

The general health is apt to be deleteriously affected. It more often affects newly married women, occasionally young girls.

Hyperesthesia. 5. The *treatment* in mild cases is the same as for hyperesthesia (par. 3). Tonics, laxatives, sitzbaths, and hygienic regulations are useful. Coitus. Coitus should not be attempted.

Forcible dilation. In pronounced cases the vaginal entrance should be forcibly dilated under anesthesia by withdrawing a widely expanded bivalve speculum. Ulceration. Ulcerated spots or diseased carunculæ should be extirpated. If the perineum be unusually high, or Lateral incision. the vaginal entrance very small, two lateral incisions through the edges of the constrictor cunni, levator ani, and transversus perinei muscles, converging in the median line just above the sphincter ani to form a V, should be made. The parts should Stretching. be stretched both before and after the cutting. Plug. A hollow glass plug about two inches (five cm.) in diameter, resembling a widened test-tube, is worn two hours, morning and afternoon, for several weeks. (J. Marion Sims.)

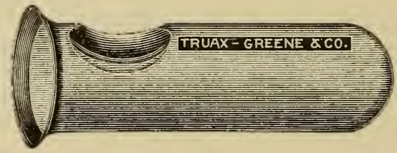


Fig. 112.—Sims' Glass Vaginal Dilator.

CHAPTER VIII.

PRURITUS VULVÆ.

Symptom. 1. *Pruritus*, or itching of the vulva, is a symptom rather than a disease. Local disease. It may be a symptom of local disease, such as follicular vulvitis, eczema, or trichiasis. It may be due to Abnormal urine. the irritation of abnormal urine, as in diabetes, cystitis, or indigestion, Vaginal discharges. or of unhealthy vaginal discharges in cases of vaginitis, follicular cervicitis, and malignant disease. It may also be a reflex sensation occasioned by disease of the rectum, urethra, or uterus. Parasites, varicose veins, obesity, and pregnancy may act as causes. Constipation and sedentary habits aggravate it. Reflex. Local causes. General.

The itching or burning sensation is characterized by its intense and intermittent nature, and may remain away for hours and days to return as bad as ever. Character. Intermittent.

2. The *treatment* consists primarily in removing the cause. The diet, and evacuations from the bowels, should be regulated, the urine rendered normal, and cleanliness secured by sitz-baths and copious vaginal douches. Two per cent. douches of carbolic acid, creolin, or acetate of lead, repeated three or four times daily, are of palliative value. Cause. Bowels, urine. Cleanliness. Medicated douches.

Local applications to destroy germs, relieve irritation, be-numb the nerves, and shield the vulva from contact with the irritating discharges, are indicated. Local applications.

One part carbolic acid in ten of the benzoated oxid of zinc ointment, one part of corrosive mercuric chlorid in 500 of emulsion of bitter almonds (Skene), one part of chloroform or dilute hydrocyanic acid with ten of glycerin or olive oil, one part of chloral or menthol in ten or fifteen of vaselin, make good applications to protect the parts and relieve the itching. When the mucous membrane is thickened, and other remedies fail, a ten per cent. aqueous solution of nitrate of silver may be applied. In pregnancy and other conditions connected with vaginal discharges, cotton dipped in a 50 per cent. solution of boroglycerid in glycerin, with or without a small percentage of menthol, may be placed in the vagina.

Frequent applications of cloths wet with cold water relieve some cases when the above remedies fail. A five per cent. solution of cocain in water usually gives temporary ease.

CHAPTER IX.

HYSTERIA AND HYSTERO-EPILEPSY.

Functional. Women. Genital disease. Excitability. Will power. Crises. Perverted function.

1. Hysteria is a functional disorder of the nervous system that occurs four times as often in women as in men, and is frequently associated with, and aggravated by, disease of the genital organs. It is characterized by an excitable nervous system and a want of will power, and is manifested by uncontrollable nervous paroxysms or *crises*, and intermediate states of perverted nerve function.

Mental shock. Example. Suggestion.

2. The *predisposing* causes are a defective or unbalanced nervous organization due to hereditary and social influences. The *exciting causes* are mental shock produced by sudden fear, intense or prolonged excitement, anxiety, or grief; also the influence of example, as well as suggestion originating in the unmerited sympathy and meddlesome ministrations of friends or relatives.

There is usually a family history of nervous disorders, or of excesses of various kinds. The training of the child is apt to be neglected, or irregular, over-indulgent, or harsh in character, developing a wilful or inordinately selfish disposition; and the hygienic surroundings are often such as prevent healthy development. When from any cause the nervous system has been subjected to a shock or prolonged strain, the solicitude of friends, or solitary brooding of the patient over the event, combined with physical ill-feelings, prolong the mental depression and develop imaginary ailments and conditions.

Variability. Hyperesthesia. Paroxysms. Explosions of anger, terror, etc.

3. The *symptoms* of hysteria vary from mere exhibitions of excitability, provoked by slight causes, to prolonged and frequent convulsive attacks. There is in some cases a hyperesthesia, mental or physical, that renders the patient more or less unfit for ordinary social intercourse. Paroxysms of uncontrollable laughter or crying, hilarity or depression, without apparent reason, explosions of anger or terror upon

the slightest provocation, headache, sleeplessness, attacks of trembling, flushing, chilliness, choking sensations, and, above all, unreasonable actions or complaints designed to impress the spectator with the importance or wonderful character of her ailment, are among the most common. A show of sympathy or attempt at correction on the part of friends is apt to bring about a crisis resembling a fainting fit or convulsion.

Unreasonable actions.

Sympathy, correction, etc.

In the severer forms signs of serious functional disturbance may be present, such as anesthesia, hyperesthesia, incomplete paralysis of the special senses or of different portions of the body, or contractures of the muscles of the face or extremities. Dyspepsia, constipation, vomiting, swallowing and regurgitation of indigestible things, persistent fasting, polyuria, anuria, imitations of barking or other unusual sounds, and all sorts of vagaries resulting from a perverted imagination assist in making up a truly kaleidoscopic clinical exhibition.

Anesthesia, etc.

Digestive and urinary disorders.

Unusual symptoms.

The anesthesia may be a hemianesthesia, a segmental or a disseminated anesthesia. Limitation of the visual field, loss of color sense, and impairment of hearing and taste are frequently observed. Hyperesthesia occurs in places, most frequently the iliac, inframammary, inguinal, spinal, and epigastric regions. These places are called hysterogenic zones, and pressure upon them may precipitate or check a crisis. Paralysis may exist as a hemiplegia, a paraplegia, or as a paralysis of a limb, of the larynx (aphonia), muscles of the eye, or occasionally of the face. Tremor may affect the head, tongue, or extremities.

In fact, almost any of the symptoms of disease of the nervous system may be simulated either by accident, design, or unconscious imitation.

4. *Hystero-epilepsy* is the name given to the cases with severe crises that resemble epileptic convulsions. After prodromic feelings of malaise or irritability, the patient experiences a sort of aura, utters a cry, falls to the ground, and becomes rigid, or contracts and relaxes the muscles as in a case of true epilepsy. After a time the motions cease, and are soon followed by violent flexion and extension of the body, and sometimes by other contortions. This lasts from one to three minutes, and

Definition.

Prodroma.

Aura.

Rigidity.

Flexion and extension.

Emotional stage. is followed by the emotional stage, in which some emotion seems to be the cause of either the movements or of attitudes taken. In ten or fifteen minutes this gives way to a stage of Delirium. delirium, and the patient gradually emerges from the attack.

But few cases are typical. Usually one or more of these states will be observed, and the attack will be milder than that described above, and may last longer and recur many times a day. The best-developed attacks are observed in institutions where patients can see the attacks in others and mimic them.

Stigmata. 5. The *diagnosis* is based upon the stigmata, such as the anesthesias, hyperesthesias, paraplegias, aphonia, limitation of Crises. vision, etc., already described, and the character of the crises. Irregularity. The irregularity of the symptoms and of the course of the Emotions, example, suggestion. disease, the influence of the emotions of the patient, and the effect of example or suggestion upon her symptoms, serve to Local examination per rectum under anesthesia. distinguish the condition from organic diseases. A local examination of the pelvic organs in young girls should not be undertaken except for decided pelvic symptoms, and then it should first be a rectal examination under anesthesia. The Patient's attention. patient's attention should not be directed to the sexual organs.

In the milder forms the frequent use of the words "terrible" and "fearful" for the description of trivial symptoms, incessant talking about their ailments, attempts at the excitation of sympathy, etc., are indications of the hysterical condition.

The epileptiform attacks are produced by excitement, or by pressure upon the hysterogenic zones, and may be broken up by cold effusions or other disagreeable shocks. They are usually characterized by the presence of emotion, or of concealed emotion or design. The movements if considerable are coordinate, the tongue is never bitten, and the body not injured. The attacks may last a long time, and be frequently repeated without the exhaustion, nor the complete loss of consciousness, nor the subsequent rise of temperature that belong to epileptic seizures. The patient never defecates or urinates during the attack.

Early. 6. The *prognosis* is good if the case is treated early. Old Old cases. cases treated under unfavorable surroundings are often hard to

Pelvic disease.

manage. Incurable pelvic disease and hereditary taint affect the prognosis unfavorably.

Surroundings. Strangers. Hygiene, tonics. Menstrual disorders. Rest.

7. The *treatment*, first of all, should be directed to a regulation of the surroundings of the patient. She should be removed from the society of those who either irritate or humor her, and be placed under the influence of those whose firm but gentle demeanor will draw her attention from her symptoms and minimize them without antagonizing her. A sojourn among strangers, with pleasant occupation or amusement, will often prevent her from giving away to her feelings, and thus may lead to a cure. Hygienic and tonic treatment (part I, chap. V) are to be employed, according to the condition. Menstrual disorders are sometimes relieved by these means, and may not need local treatment. Menorrhagia and dysmenorrhea call for rest during the periods.

Rest treatment.

Cases connected with great debility, weakmindedness, and unfavorable home influences may require the Weir Mitchell rest treatment (see next chapter, par 6, small type).

Valerian, asafetida. Camphor and lupulin. Laxatives. Bromid.

Two teaspoonfuls of the elixir of the valerianate of ammonia, or four or five grains (0.25 to 0.35 gm.) of asafetida, every four hours, often have a magic effect upon the excitable condition in mild cases. Camphor and lupulin at bedtime sometimes acts well in producing sleep. Well-nourished cases may require saline laxatives daily, and 15 grains of a bromid (one gm.) three or four times daily.

Cold effusion. Pressure. Ammonia. Emetic. Apomorphia.

The paroxysm may be broken up by throwing cold water on the face and chest, by pressure upon one of the hysterogenic zones, by inhalations of the spirits of ammonia, or by an emetic. If she can not be made to swallow, $\frac{1}{12}$ of a grain (0.0055 gm.) of apomorphia may be given hypodermically. (Dana.)

CHAPTER X.

NEURASTHENIA (Nervous Prostration).

(*The Rest Cure.*)

Conditions. Cerebrospinal system. Vasomotor system. Blood supply.

1. The chief conditions noticeable in neurasthenia are weakness and irritability. There is imperfect nutrition of the nerve-cells with cerebrospinal hyperemia, or, exceptionally, anemia. There is also a weakness of the vasomotor nervous system, with consequent irregularities in the supply of blood to the skin and internal viscera.

Heredity. Social surroundings. Mental conditions. Debilitating influences.

2. Among the *causes* are a hereditary weakness of the nervous system, unhealthy modes of living, prevalent among wealthy families with social responsibilities, long-continued pain, anxiety, or mental strain, with insufficient rest or sleep, rapid child-bearing, sexual excesses, prolonged septicemia, and pelvic disorders, with the invalid habits and notions engendered thereby.

The attack.

The attack is often precipitated by an operation, a spell of sickness, attendance upon a sick friend, domestic infelicity, sudden fright, shock, etc.

Weakness, etc., after exertions. Pressure on top of head, etc. Pains without adequate local cause.

3. The ordinary *symptoms* are weakness and a feeling of exhaustion after ordinary exertions, pressure on the top of the head, vertigo, wakefulness, irritability of temper, sensitiveness to noises, anxiety over symptoms and complaint of pain or distress in the iliac, intercostal, or epigastric region, without adequate local cause.

Solicitude of friends. Seclusion. Attitudes. Food.

The symptoms are made worse by the solicitude and pampering of friends. The humored patient is apt to take to the bed in a darkened room with all noises shut out. She may even assume certain attitudes, rejecting all pillows, or perhaps multiplying them indefinitely in order to rest all parts of her supersensitive and weary body. Food may distress her until her restricted diet no longer nourishes her well, and she becomes greatly emaciated. Thus not only her special senses, but all parts of her body are shielded and rested from an imaginary inability to stand the supposed strain of ordinary function. Hysteria, and occasionally spinal irritation, may aggravate the difficulty.

Imaginary inability.

Hysteria, spinal irritation.

The weakness is real, the heart's action easily disturbed, the extremities cold, the sexual functions debilitated, digestion impaired, and the bowels constipated, but the importance of these conditions is exaggerated in her mind by a constant brooding and a tendency to despondency.

Symptoms real.

Importance exaggerated.

Despondency.

In many cases only a few of these symptoms are present.

4. The *diagnosis* must be made from hysteria, which is changeable in its symptoms, is not accompanied by such muscular debility or malnutrition, has (or has had) more distinct crises, has stigmata, and is relieved, instead of being made worse, by disturbance. The neurasthenic is anxious to be relieved, and is temporarily improved by encouragement, while the hysterical patient is usually antagonistic.

From hysteria.

Changeable

Less debility.

Crises, stigmatæ.

Disturbance.

Antagonistic.

Chronic organic diseases of the nervous system have a greater preponderance of the symptoms referable to the nervous centers over those of weakness and irritability.

Organic diseases.

Spinal irritation presents more pain and sensitiveness along the spine and spinal nerves, and greater prominence of motor and sensory symptoms in the parts supplied by spinal nerves, with fewer mental and cerebral symptoms.

Spinal irritation.

5. The *prognosis* is favorable except in those cases dependent mainly upon hereditary characteristics. The recovery is usually slow if the symptoms are well marked and have continued for some time. Rapid recovery is apt to be followed by relapse if the patient returns to her old surroundings too quickly.

Heredity.

Slow.

Relapse.

6. The *treatment* consists in removing her from her unfavorable surroundings, and placing her under influences cal-

Change surroundings.

Mental rest and physical vigor. culated to rest the mind and develop physical vigor. Medicines. Medicines should be used but sparingly, and be dispensed with as soon as possible.

Hysteria. Mild cases, particularly those connected with symptoms of hysteria, may be treated as recommended for hysteria (chap. IX, par. 7).

Sponge baths, etc. Sponge baths, massage, mild galvanism, general faradization, abdominal massage for constipation (part I, chap. V, par. 7), Diet, naps. with a restricted diet and a nap in the middle of the day, should be employed in the beginning. As the appetite im- Increase diet. proves the diet should be increased, but remain simple. She Exercise. should take a walk and practice calisthenics twice daily, and after a while take up horseback riding, bicycling, or other out- Mind. door exercises. The mind should be interested without being Minimize symptoms. burdened by any systematic work. She should be allowed no time to think of her symptoms, which, whenever complained of, should be explained away and never referred to.

Medicines. Valerian or asafetida may be given for nervousness, or a bromid or sulphonal for sleeplessness and headache, but these remedies should be steadily diminished in quantity and discon- Patient instructed. tinued after a few days. The patient must be taught the harmfulness of nervous sedatives and the necessity of fresh air, plain food, exercise, and regular habits.

Local treatment. Local treatment should be coupled with encouraging reports of progress, and be discontinued as soon as possible.

Cases that resist treatment can usually be cured, or at least started on the road to recovery, by the Weir Mitchell rest cure modified to suit the case. The following is an enumeration of the essential details as followed out by myself:

Promise the patient a positive cure on condition that you are to have complete control, she to concern herself with nothing but following directions. All friends and relatives are to be kept away from her as long as you consider it necessary. Take the patient away from home, or isolate her in a quiet room, and place her in charge of a competent trained nurse, who is healthy, strong, cheerful, discreet, and firm, but not authoritative in manner. Allow no visitors. Write down complete directions each day, in order that there may be no deviations, and that the nurse, who is supposed to have no authority to deviate, may play the rôle of companion and helpmate to the patient in carrying them out, rather than that of an authority. The firmness of the nurse consists merely in not allowing any deviation from orders; her manner must be cheerful and her society entertaining.

Put the patient to bed for two or three days. Give her no food but an ounce of milk with an ounce of lime-water every hour during the first day, and double that quantity at bedtime, and once or twice during the night. Water *ad libitum*. Give double the above quantity of milk and lime-water on the second and third days. If patient is very hungry, she may have a little toast or cracker at meal times on the third or fourth day; after that meals as directed farther on. Fleshy patients are kept on a liquid diet two or three days longer than those who are emaciated.

Each morning, after a nourishing drink, the patient's toilet is attended to by the nurse, and includes a general sponge bath with alcohol. After that, breakfast, if she has got that far along; then a rest of half an hour or so, and, if there be constipation, abdominal massage (part I, chap. v, par. 7), followed, if necessary, by an enema of plain water. Then some light reading or entertaining conversation by the nurse. During the forenoon general faradization—patient's feet on one electrode (more often the negative) and the hands grasping the other. Part of the time the nurse grasps one electrode in one hand, and with the other well moistened rubs gently over the different muscles of the body. The current should be scarcely felt by the patient the first time or two, and never uncomfortably strong. The seance is continued from one-fourth to three-fourths of an hour, according to the patient's toleration, stopping short of producing weariness. Massage, or gentle rubbing and light kneading of the muscles of the trunk and limbs, is given before bedtime, to the extent of gradually bringing on slight weariness and sleepiness. The first massage treatments should be mild and soothing, later more vigorous.

After three days the patient sits up half an hour morning and afternoon, and increases the time by half an hour on each occasion until she sits up two hours morning and afternoon. After that she is up all day, and walks about the room, but lies down two hours in the middle of each day. The electricity may be given when she lies down; but in some cases the electricity makes the patient sleepy, and if she does not sleep well it may change places with massage, and be used at bedtime.

The patient must now take Swedish movements, respiratory exercises, or work with half-pound wooden dumb-bells, or one-pound Indian clubs twice daily, until her arms begin to tire, and in a few days more must go out for a short walk twice daily with the nurse, but without at first meeting her friends. The exercises and walks should be of very short duration in the beginning, and should not tire the patient out, but should be *increased gradually* and *systematically.*

Before many days the time of the patient and nurse will be completely filled with work, and it will become a matter of good management to get it all in along with the midday rest. The patient's powers of endurance have increased wonderfully by the end of a month, and her progress has been regulated in such a systematic and gradual manner that she has not been conscious of doing anything to bring on old pains. She and the nurse should have good times together, reading, walking, exercising, napping, and talking over their new experiences. The physician's daily visit should also bring with it new and pleasant thoughts. If she has felt pains, the nurse's and physician's cheerful assurance that they are but the lingering pains of habit, and that they will go away very soon, never to return, together with the constant agreeable occupation for the body and mind, have made her forget them and believe herself cured of them. In the meantime she gains flesh at the rate of three to five pounds a week, and has but to look in the mirror to be convinced of her improvement. She gains in comeliness as well as strength.

The diet after the third or fourth day may be rapidly increased, to keep pace with the accelerated tissue changes due to massage, electricity, and added exercise. A glass of milk is taken with meals, between meals, at bedtime, and upon awakening in the morning. A little toast, cracker, or cooked cereal may be given at meal-time. Toward the end of the first week and after that, fresh broiled, baked or roasted beef, mutton, fish or fowl, or a soft egg, twice daily, with toast, cracker, bread and butter, fruit and jelly are allowed. The third meal should consist of milk, cereals, bread, and fruit. The nurse should either prepare or arrange the food so that it will come to the patient fresh, hot, and daintily served. After the third week, potatoes and light vegetables may be given once daily. Pie, cake, pudding and the like should be prohibited. Milk should be given in large quantities throughout. The nurse should study the patient's likes and dislikes, but should arrange and vary the bill of fare each day without consulting her about details.

Even patients that can not ordinarily drink milk can take it in the small diluted quantities recommended for the first days, and often can then continue it in larger quantities. If not, a thin gruel made with half milk, or a thin water-gruel with the white of an egg added to each two ounces (60 gm.) or well-skimmed broth may be substituted. Milk is, however, very much to be preferred.

After three or four weeks, or after the patient is able to take long walks, and is no longer solicitous about her condition, she may occasionally see friends who, however, are cautioned not to talk about her previous illness.

The patient should then be taught to continue taking midday rests and increasing her exercise as before, and never to lie down for pain, nor take medicine for nervousness or sleeplessness. It is better for her to keep the nurse for a week or two after she associates with her family, and for the physician to see her twice weekly for another month, in order to explain away symptoms and give directions about exercise, diet, habits, etc. Aggravated cases should not pass entirely from under his influence for many months.

PART FIVE.

TRAUMATIC LESIONS OF THE GENITAL TRACT.

CHAPTER I.

CONTUSIONS AND HEMATOMA OF THE VULVA.

Hemorrhage.

1. **Contusions** of the vulva are of importance because of the liability to hemorrhage from the plexus of veins about the vestibule.

Causes.

Falling upon sharp or hard objects, rough marital embraces in very young or old people, kicks, cuts, etc., are the ordinary causes.

Treatment.

They are to be treated by cold and soothing lotions, and, if the skin is broken, by cleanliness and antiseptic applications, the same as contusions occurring elsewhere on the skin. Deep lacerations should be sutured to prevent hemorrhage and subcutaneous extravasation of blood.

Causes.

2. **Hematoma** of the vulva may result from the rupture of a varicose vein during pregnancy, from the pressure of the head during labor, from contusion, or from the puncture of a vein by a needle during an operation.

Location.
Formation.
Size.
Changes of the blood.

When it occurs during labor, it may distend the vulva and extended into the pelvis, or even under the skin beyond the vulva. It may form rapidly or slowly. In the non-pregnant state the tumor formed is seldom larger than an egg, often smaller. The blood either coagulates or thickens, and becomes inclosed in a capsule.

May be none.

3. Sometimes no *symptoms* accompany its formation. Usu-

ally, however, a burning pain is felt, followed by a sensation of fullness or tension in the parts, and perhaps by a desire to urinate and defecate. An elastic, globular tumor is discovered in the labium majus, which is not very tender, if at all, and which, after a few days, gradually diminishes in size and finally disappears. Small ecchymoses are in some cases seen in the venous radicles surrounding it.

Burning and tension. Urinate, etc. Tumor. Characteristics. Ecchymoses.

When it occurs during childbirth, the amount of blood effused may impede labor, or even endanger life.

During labor.

4. The *diagnosis* from hernia is made by the existence of pregnancy, the manner of the occurrence of hematoma, its seat, the surrounding ecchymoses or varices, the absence of succussion upon coughing, its irreducibility, and (except in the beginning) its insensitiveness.

From hernia.

5. The *treatment* of large hematomas, seen within the first few hours, consists in evacuating the blood by a longitudinal incision on the inner side of the vulva, and sewing up its bed by deep sutures which include the ruptured vein. Small hematomas should not be disturbed. When a hematoma of several days' duration is incised, the capsule should be extirpated and the wound completely closed by sutures.

Large. Small. Old ones.

Incision and packing is not good surgery, since it converts the hematoma into an ulcer or abscess, and thus makes the condition worse. If suppuration has already taken place, it may still be possible to remove the capsule, disinfect with a 1 : 2000 solution of corrosive mercuric chlorid, and by deep sutures secure a primary union of the raw surfaces.

CHAPTER II.

LACERATION OF THE PERINEUM.

1. **Varieties of Laceration.** Laceration of the perineum is said to be complete when it involves the sphincter ani and anal mucous membrane, and partial when it does not.

Varieties.

Involve spincter ani.
Degrees.
Varieties of partial.
Vaginal.
Involve perineal body.

Complete lacerations may barely sever the sphincter ani, or may reach one or two inches (three to five cm.) up the recto-vaginal septum. *Partial lacerations* do not extend through the sphincter, and may be entirely internal or vaginal, or entirely external in the perineal body. Vaginal lacerations may extend along the median line, but usually they are lateral and diagonal in direction, and may be either unilateral or bilateral. In the majority of cases they extend down through the vaginal entrance into the perineal body. Sometimes the tissues are torn transversely just behind the remains of the hymen, sometimes they are torn asunder in various directions. Occasionally minute scattered subvaginal lacerations leave a general vaginal and vulval relaxation and condition of subinvolution, without any visible laceration. Exceptionally the fetus passes through the perineal body leaving the fourchette intact (central laceration).

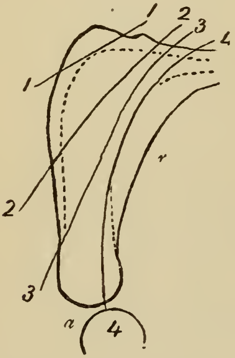


FIG. 113.—NORMAL SHAPE OF PERINEAL BODY IN MEDIAN SECTION. The lines *1, 2, 3*, and *4* show the extent of various degrees of external lacerations. *r.* Rectum. *a.* Anus.

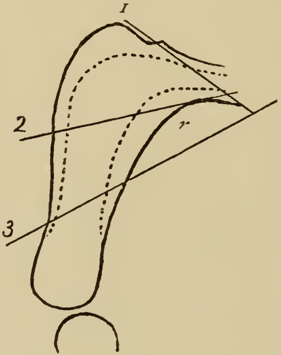


FIG. 114.—The lines *1, 2*, and *3* indicate the depth of the lateral or diagonal lacerations as they extend outward into the perineal body to one side of the rectum. *r.* Rectum.

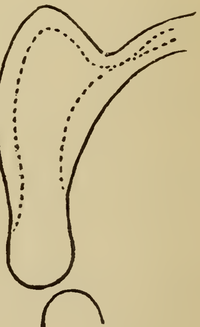


FIG. 115.—Deformity produced by uncicatrized transverse laceration just within the vaginal entrance.

Transverse.
Various directions.
Subvaginal.
Through perineal body.

Non-union, etc.
Displacement.

2. The transverse and the scattered subvaginal lacerations often make no perceptible attempt at union or cicatrization, and leave the vagina and vulva relaxed. Posterior colpocele,

rectocele, anterior colpocele, cystocele, and even retroversion and prolapse may then result.

The other forms of laceration tend to heal, partly by primary union and partly by cicatrization, but some vulval deficiency and displacement usually remain.

Primary union. Cicatrization. Result.

3. The **causes** are a too rapid expulsion of the head during labor, or a disproportion between the maternal and fetal parts, pressure of the blades of the forceps, unnatural rigidity or deformity of the maternal tissues, firmness of the cranial bones of the fetus, etc.

Rapid expulsion, disproportion, etc.

4. The **symptoms** are those belonging to the displacements. In complete lacerations the intestinal gases and feces pass involuntarily, giving rise to more or less rectal, vaginal, urethral, and cutaneous irritation.

Of displacement. Involuntary passages. Irritation.

The immediate symptoms are hemorrhage and local sensitiveness to the touch, followed by some inflammatory reaction about the wound.

Hemorrhage and sensitiveness. Inflammation.

In complete lacerations that involve only the edge of the anal mucous membrane, the cicatrization is sometimes sufficient to prevent the escape of the feces except under pressure.

5. **Diagnosis.** Recent lacerations are known by the pain produced upon touching the parts. On account of the general discoloration and relaxation of the tissues immediately after labor, a careful inspection of both the perineum and vaginal entrance, with the patient in the dorsal position, and before a good light, is necessary. By separating the labia and sponging off the blood, the difference between the shiny vaginal membrane and oozing raw tissue becomes apparent. The anterior vaginal wall should be held up against the pubes by a vaginal retractor and the lacerations traced up into the vagina. They may extend as far as two inches beyond the entrance. The finger should be introduced into the rectum and the thumb into the vagina, and the thickness, or perhaps the

Pain. Inspection. Difference. Anterior retractor. Distance. Recto-vaginal palpation.

absence, of the sphincter ani and rectovaginal tissues demonstrated.

Deficiency.
Relaxation.
Pubic rami.
Into rectum.

Old lacerations are diagnosed by palpation and inspection. The finger detects the deficiency at the posterior commissure, or the relaxation of the vaginal entrance, or both. The finger can readily palpate the pubic rami down to, or almost to, the sphincter ani in the partial forms. In the complete form the finger passes down along the pubic rami into the anus or rectum.

Inspection.
Rectal mucous membrane.
Edge of septum.

Upon inspection the deficiency and displacement are apparent. When the rectum is affected the darker red rectal mucous membrane is visible at the bottom of the vulval deficiency, which is progressively wider below, *i. e.*, posteriorly. The finger introduced into the rectum finds the torn edge of the rectovaginal septum either at the sphincter or higher up on the anterior rectal wall.

Finger in rectum.
Cicatrices.
Thickness.

When the sphincter is not involved, the finger in the rectum can be hooked forward so as to put the perineal tissues on the stretch and reveal the blanched cicatrices even to their small ramifications. If at the same time the thumb is placed in the vagina the thickness of the remains of the perineum can be determined.

Immediate repair.
Parts benumbed.
Cocaine.

6. **Treatment.** Lacerations of the perineum should be repaired within a few hours after labor, preferably immediately after, because the parts are then more or less benumbed, and a general anesthetic can often be dispensed with. A few applications of a five or ten per cent. solution of cocain anesthetize the parts sufficiently in lacerations of moderate extent.

Description of operation for partial laceration.

The patient is placed on a table in the dorsal position and the anterior vaginal wall held out of the way by a retractor. The blood is sponged away, the vagina loosely packed with strips of aseptic gauze, and the vaginal entrance washed with a 1 : 2000 corrosive mercuric chlorid solution. The ragged edges are then trimmed off with scissors. A short, half-curved needle, or needle with a handle, threaded with silkworm-gut, is introduced near the upper edge of the vaginal wound so as to take a deep lateral hold upon the connective tissue and emerge at the bottom. It is then reintroduced beside the point of exit and brought out again opposite the first point of entrance. Other sutures are introduced a centimeter (⅓ of an inch) apart, until the external parts are reached. The wound is disinfected again and the sutures tied in the order of their introduction. The external wound is then closed by sutures introduced from side to side under the edges of the skin.

Silkworm-gut sutures.

If complete asepsis can be commanded, and reliable catgut procured, continuous catgut tier sutures may be used for the purpose of bringing the surfaces in broader contact and forming a longer perineum and higher fourchette than is obtained with the ordinary deep sutures. A continuous suture is run along the bottom of the wound from within outward, and then back a little higher up toward the edges, and is tied when it reaches back to the starting place. The same thread can now unite the superficial portion by a continuous suture, running under the vaginal edges, or the same may be accomplished by interrupted sutures of catgut or silkworm-gut.

Sphincter torn.

7. When the sphincter is torn but the rectal wall remains intact, the first two external sutures should be introduced under the edge of the skin, one at the inner and one at the outer border of the end of the torn sphincter, and should extend inward a little beyond the anal tear, in order to draw the torn edges of the rectum down against the sphincter and completely close the rectal tear. When the rectal mucous membrane is extensively torn it may be first sewed by catgut or fine silk, or may be left without sutures, provided the vaginal sutures can be made to include the entire thickness of tissue down to the rectal edges. In that case the first, or farthest, suture should, instead of going straight down into the wound, take a direction diagonally toward and beyond the top of the tear, in order to get a large hold upon the tissues, and to

Rectum opened.

draw the upper portion of the rectal tear downward and bring it more under the protection of the deep external sutures. The lower external ones should enter deeply into the tissues in order to add support to the rectal sutures.

Delayed operation.

8. If the operation has been delayed for several days the original wounded surface may be freshened by a sharp curette or scissors or knife, thoroughly disinfected, and the parts be brought together in the same way. It is necessary to denude the surfaces until blood oozes freely from them in order to insure union.

Douches.

9. The aftertreatment consists in plain vaginal sterile douches following each passage of urine. After the first two days one per cent. carbolic acid or 1 : 4000 corrosive mercuric chlorid douches twice a day help to prevent infection. Daily liquid stools should be maintained by laxatives after the second day, more particularly if the sphincter ani have been torn. The sutures may be removed in ten or twelve days in incomplete tears, but in the complete variety the lower two or three sutures should be left for at least three weeks.

Laxatives.

Removal of sutures.

The instruments needed are an anterior vaginal retractor, a pair of scissors, sponge holders, large and small needles and needle-holder, or a needle on a handle, hemostatic forceps, and two tenacula. The tenacula are useful in drawing torn edges together to ascertain the true relationship of the parts. A solution of 1 : 2000 corrosive mercuric chlorid should be kept convenient for the disinfection of the hands. Silkworm-gut, sponges, and sterilized gauze are required.

Old partial tears.

10. In cases of old partial tears, in which the scars extend diagonally up the posterior vaginal sulci, or in which there is posterior colpocele or rectocele due to uncicatrized lacerations, lateral or bilateral denudations extending up the vaginal sulci should be made, and should extend externally over as much of the perineum as necessary, when closed by sutures, to restore the parts to an approximately normal size and shape.

Denudation.

Emmet's technic.

Emmet's technic modified is probably the best to follow in

Fixing limits with tenacula.

Outlining denudation.

this kind of operation. A tenaculum should be introduced into the posterior vaginal wall in the median line at the crest of the rectocele, or just beyond the cicatricial tissue, and another just external to the remains of the hymen about a centimeter, or ⅓ to ½ of an inch, below the level of the external meatus on either side, and the three points be brought together. If properly placed the tenacula should meet below the meatus urinarius with but little resistance from the tissues. A fourth tenaculum catches up the tissues in the median line near the lower end of the fold that extends down toward the anus when the lateral tenacula are approximated. Then the four tenacula are separated and held by assistants, while the operator with a knife makes a straight superficial incision connecting the lateral tenacula with the external one, and thus defines the external limits of the denudation. A similar line is drawn from the median vaginal tenaculum, and

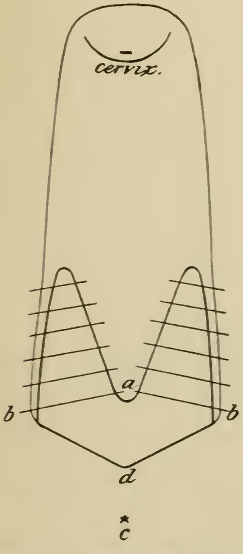


Fig. 116.—Denudation for Bilateral Perineorrhaphy, with Sutures Passed. (*Modified from Emmet.*)

a. Crest of rectocele or point on posterior vaginal wall beyond the cicatrices, into which a tenaculum is thrust. *b*, *b*. Points on lateral vaginal wall, into which tenacula are thrust. *c* Anus. *d*. Lower edge of perineal denudation in the median line. The approximation of *a*, *b*, *b*, forms folds of vaginal membrane that are to be denuded. A tenaculum catches the tissues at *d*, and determines the external edges of the denudation *b*, *d*, *b*.

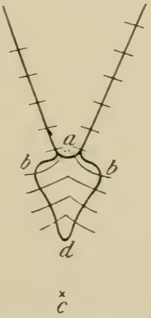


Fig. 117.—Same, with Vaginal Sutures Tied.

another from one of the lateral tenacula, to meet each other from one to two inches, or three to five cm., beyond the vaginal entrance on the lateral vaginal wall. The same is done on the other side. The outlined figure (Fig. 116) is then denuded by snipping the tissues with scissors curved on the flat, or Emmet's angular scissors, under the right lateral (patient's left) tenaculum points, and continuing the snipping along the line extending into the vagina so as to remove a strip as far as the upper angle. Another strip is similarly removed beside the first strip, and so on, until one of the vaginal triangles is denuded. Then a transverse suture of fine silkworm-gut or hardened catgut is introduced at the upper angle, passing entirely under the denuded surface, and tied, and then another is introduced $\frac{1}{2}$ of a cm., or $\frac{1}{5}$ of an inch, lower down and tied, and so on until the raw surface is obliterated. Then the other triangle is denuded and similarly stitched. Finally the perineal area is denuded and closed by coarse silkworm-gut sutures passed across from side to side introduced through the skin near the edge. The upper external suture, which is placed first and tied last, should catch the tissues at the point of vaginal wall where a tenaculum was first introduced, and thus connect the three rows of sutures. A stream of 1 : 2000 corrosive mercuric chlorid solution, or of sterilized water, should run over the parts as each suture is tied. After the patient is put to bed, dry sterilized gauze is placed between the nates to absorb all moisture.

Denudation by strips.

Sutures.

Upper external.

Dressing.

Urination.

Douches.

Bowels.

Each time the patient urinates the vagina is douched, the perineal sutures are irrigated with sterilized water, and fresh gauze is applied. After the second day a one per cent. carbolic acid douche is preferable. The bowels should be moved daily after the second day. The sutures are removed in ten days or two weeks.

The instruments required are a small scalpel, a pair of long-handled scissors curved on the flat, or Emmet's angular scissors, four tenacula, a needle holder, needles slightly curved on the end which are two cm., or ⅔ of an inch, long, sponge-holders, an anterior vaginal retractor, hemostatic forceps, and a leg-holder. An assistant must be at each knee, and two assistants or nurses to take care of sutures, instruments, change the water, etc. Fine and coarse silkworm-gut sutures, plenty of boiled water for the sponges, 1 : 2000 solution of corrosive mercuric chlorid for irrigation and for the hands, sterilized gauze, sponges, etc., should be provided.

Tait's flap operation.

11. When a partial laceration is median or entirely external, as shown by the scar tissue, with only moderate relaxation of the vaginal entrance, Tait's flap operation, the most easily and quickly performed of all perineal operations, is indicated.

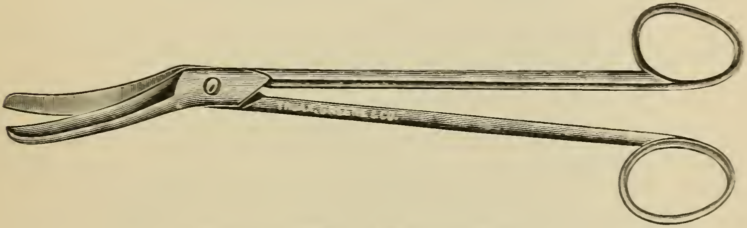


Fig. 118.—Emmet's Angular Scissors.

Steps.
Fingers in rectum.
Transverse cut.
Lateral splits.
Flap drawn up.
Deeply cleft.

Two fingers of the left hand are introduced into the rectum to serve as a guide, while the lower sharp point of a pair of scissors is thrust into the base of the patient's left labium (operator's right side) a little above the level of the anus, and a tranverse cut made across to the other labium. Then both labia are split upward from the ends of this tranverse incision, so as to make a U-shaped incision, extending down one labium across the perineal body and up the other labium. The flap thus produced is grasped by forceps and drawn up in front of the urethra. If it be found that the parts have not been deeply cleft, they should be cut deeper, that a broad raw surface of opposing labia on either side may be exposed. The flap should be long enough in the middle to reach above the mouth of the urethra.

Sutures.
Under edge.
Grasp deeply.

With a full-curved surgical needle, or a needle with a handle, a silkworm-gut suture should be entered under the edge of the skin at the upper end of the right labial cleft (patient's left), and made to grasp deeply the labial and perineal connective tissue laterally, and emerge in the median line a little above the base of the flap, grasping its lower portion. It should again enter the tissues beside this point, and emerge under the edge of the skin at the upper end of cleft of the opposite labium. A similar suture should be introduced a little less than a centimeter, or a quarter of an inch, above this one, and others below this. One or two superficial sutures may be introduced through the vaginal folds at the

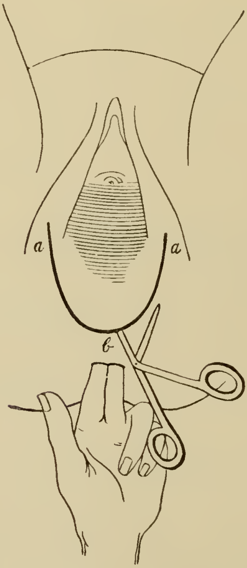


Fig. 119.—Line of Cleavage in Tait's Perineorrhapy, denoted by the heavy line, *a*, *b*, *a*. (See par. 11.)

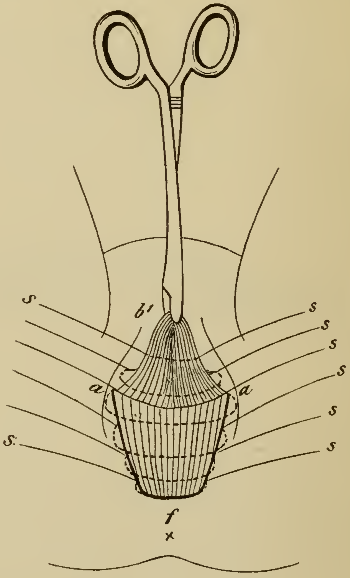


Fig. 120.—Flap Raised. *b′*. Point of flap raised from *f*. *s*. Sutures passed *b′*. *a*, *f*, *a*. Denuded space. The dotted lines indicate the course of the sutures underneath the surface, including a liberal hold on the lateral tissues without including the skin in their grasp.

Superficial.

upper end of the wound, but they should not include much of its substance for fear of cutting off its circulation. If the main sutures have not grasped wide enough laterally, two or three superficial ones may be required to approximate the edges of the perineal skin. **Tieing.** The lower suture should be tied first and the upper one last, while a stream of a 1 : 2000 solution of corrosive mercuric chlorid or sterilized water runs over the parts. Two or three superficial sutures may be required to approximate the cutaneous edges.

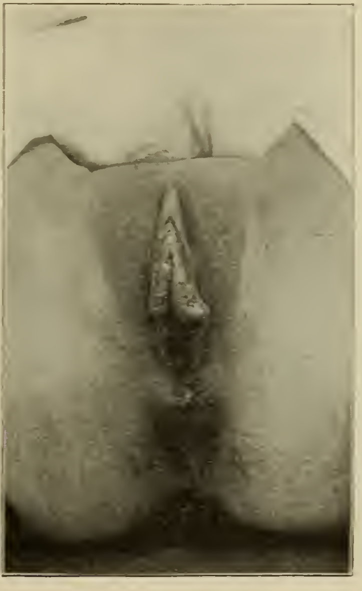


Fig. 121.—Moderate Partial Laceration of Perineum, Before Operation. (*Author's case, from photograph.*)

The aftertreatment is the same as that described in the preceding paragraph.

The wider and deeper the transverse cleft, or bottom of the U, the more effect do the sutures have upon torn fibers of the levator ani.

The instruments needed are a pair of sharp-pointed angular scissors, hemostatic forceps, large full-curved surgical needles, or a needle on a handle, coarse silkworm-gut sutures, and the usual sponges, gauze, antiseptic solutions, etc.

Tait's flap operation for complete laceration.

12. Tait's method gives the best results in complete lacerations.

Clefts.

The same labial clefts are made from a level with the torn edge of the rectovaginal septum upward, and also across the edge of the septum so as to separate the vaginal and rectal membranes for about one cm., or $\frac{1}{3}$ of an inch. In order to expose the ends of the sphincter, a cleft is made on either side from the points of junction of the descending and transverse clefts, diagonally backward and outward, for a little more than a centimeter, or about half an inch, and as deep as

Ends of sphincter.

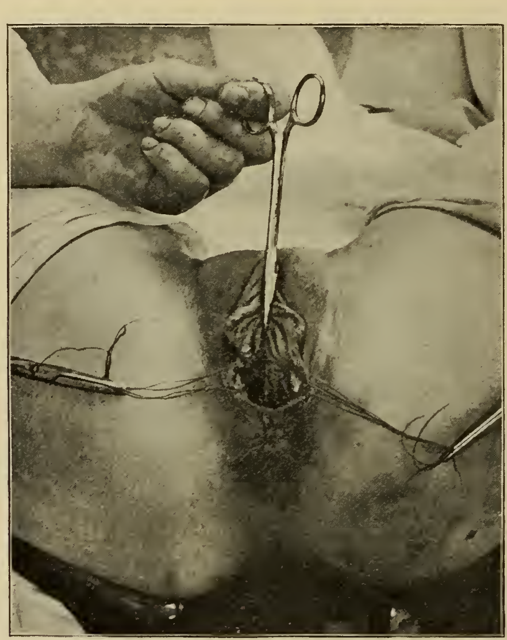


FIG. 122.—TAIT'S PERINEORRHAPY. FLAP RAISED AND SUTURES PASSED. (*Same case as Fig. 121.*)

the estimated thickness of the sphincter. These clefts are at right angles with the retracted ends of the sphincter, and expose the torn edges of the fibers.

Adjustment of flaps.

The flap is held up as in the operation for incomplete laceration, and the edges of the anal mucous membrane are grasped by forceps and drawn together, reforming the circle of the anus (*s*, Fig. 125). The first stitch is introduced at the edge of the skin near the anal mucous membrane, takes a deep hold of the sphincter, passes around just beyond the split edges of the rectovaginal septum, and back through the opposite end of the sphincter. The next suture passes under the edge of the skin at the bottom of the lower cleft, up (near *d*) across the rectovaginal septum, just above the other suture, and back on the other side. These sutures approximate the sphincter and close the rectum, and should have a *deep* hold upon the tissues. The remaining threads are entered as for

Sutures.

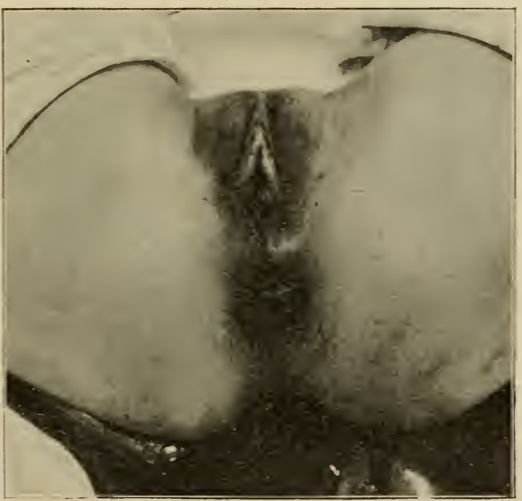


FIG. 123.—OPERATION COMPLETED. (*Same case as Fig. 122.*)

a partial laceration (Fig. 120). Tieing. They are all introduced and then tied, beginning with the lowest one.

Bowels. After complete perineorrhaphy, in addition to the attention recommended for incomplete tears, a daily *liquid* movement of the bowels should be secured after the second day. The lower sutures should be left for four weeks.

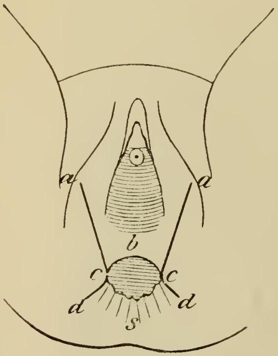


Fig. 124.—Lines of Cleavage of Tait's Perineorrhaphy for Complete Laceration.

a c, *a c*. Lines of labial clefts. *c*, *b*, *c*. Edge of rectovaginal septum which is to be split. *c d*, *c d*. Anal clefts to liberate the lacerated ends of the sphincter ani, *s*.

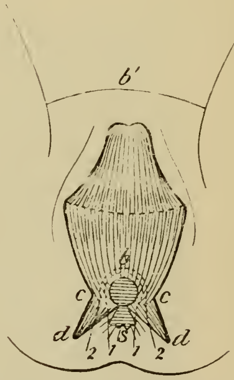


Fig. 125.—Same, with Flap Drawn Up.

Lines 1 and 2, including the dotted curved lines, indicate direction of the two lower sutures which approximate the raw edges between *c d*, *c d*, and close the rectal deficiency, *c*, *b*, *c*. The lines or edges passing from *d*, to meet each other at the reconstructed anus just over sphincter, *s* (and which were separated from the edges *c d*, *c d*), are drawn by the sutures, so that *d* comes in contact with *d*, thus uniting the two edges and the exposed ends of the sphincter, *s*. (The ends of the lines at 2, 2 should have emerged from the wound nearer the angles at *d*, *d*.)

The preparatory treatment is the same as for a vaginal section (part I, chap. II, par. 8). It is well at the beginning of the operation to douche out the sigmoid flexure with plain water, and remove all solid pieces that can be reached by the finger, for the patient, not having been able to retain ordinary enemas, is not always completely relieved of the scybala beforehand.

The instruments are the same as for the incomplete lacerations. The success depends to a certain extent upon the preparation of the alimentary canal, which should be as thoroughly evacuated the day before the operation as for abdominal section (part I, chap. II. par. 8).

Vaginal sutures. 13. When the laceration extends too far up the rectum to be entirely drawn within the grasp of the lower suture, vaginal stitches must be taken. The rectovaginal septum is deeply split all around, near the rectal wall, that as the split tissues Splitting septum.

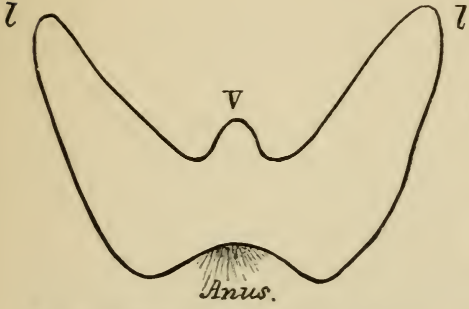


Fig. 126.—Hegar's Denudation for Complete Laceration.

v. Vaginal triangle. *l.* Upper end of labial denudation.

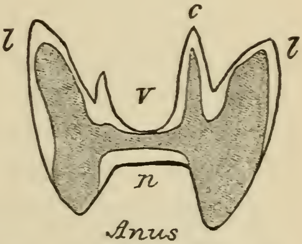


Fig. 127.—Freund's Bilateral Denudation.

l, l. Labia. *v.* Posterior vaginal wall. *c.* Vaginal denudation around cicatrix. *n.* Rectum.

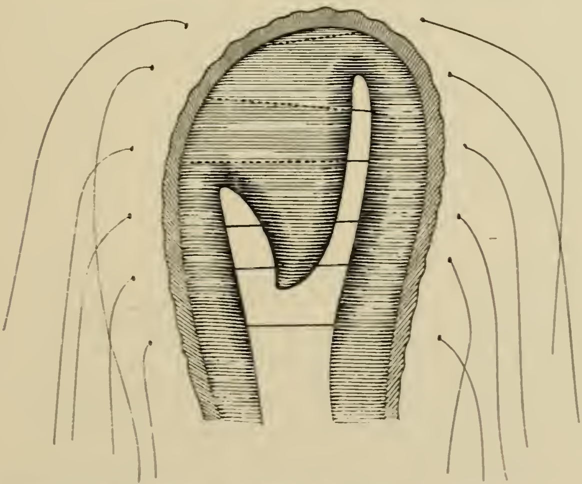


Fig. 128.—Emmet's Broad Vaginal Denudation Covering Both Ends of Bilateral Rectal Tear. Sutures Passed. (*Emmet.*)

are separated the larger mass of tissues will be on the vaginal side. Then a suture is introduced at the right vaginal raw edge near the internal end of the tear, and made to take a Sutures.

Diagonal direction.

diagonal direction inward so as to reach beyond the end of the tear, and is returned on the other side in a corresponding outward diagonal direction, without piercing the rectal mucous membrane, to a point on the left vaginal edge opposite the point of its first introduction. The diagonal direction gives the suture a much larger grasp of tissue, increases its efficiency, and shortens the tear. The remainder of the rectal portion is sewed with sutures passed in the same diagonal direction. Two or three usually suffice. The external parts are closed as recommended in the preceding paragraph.

Complete laceration may also be repaired by denuding the opposed labial and vaginal surfaces and bringing them together in the median line. Hegar (Fig. 126) makes a triangular vaginal denudation covering or surrounding the rectal tear, while A. Freund (Fig. 127) makes two lateral vaginal denudations passing up either side of the vaginal tongue (*v*) left by the bilateral diagonal laceration. Emmet (Fig. 128) makes one broad vaginal denudation, covering both ends of the rectal tear if it is bilateral, to get a large approximation of connective tissue over the rectum.

CHAPTER III.

URINARY FISTULA.

Definition.

1. By urinary fistula we mean a communication of the vagina or uterus with the bladder, urethra, or ureters.

Varieties.

The most common form is the *vesicovaginal* fistula, situated in the vesicovaginal septum. The other forms are the *vesico-uterine*, between the bladder and uterus ; the *urethro-vaginal*, between the urethra and vagina ; the *utero-vesico-vaginal*, in which the opening involves both the vagina and cervix uteri as well as the bladder ; the *ureterovaginal*, in which a vaginal fistula involves the lower end of the ureter ; the *uretero-vesicovaginal*, in which the ureter, the bladder, and vagina are involved; and the *ureterocervical,* in which the ureter opens into the cervical canal.

2. The extent of the fistula or defect varies from an opening that is invisible to a deficiency of a large part or all of the vesicovaginal septum, anterior wall of the cervix, and posterior wall of the urethra. Extent.

Cicatricial contraction with distortion and displacement of the uterus and vaginal walls, and more or less rigidity of the parts, exists in connection with large fistulæ. Displacement, etc.

3. **Causes.** Nearly all such fistulæ are the result of necrosis of tissue following prolonged pressure of the child's head during labor, although the fistula may not become established for several days, or even two or three weeks afterward. A few are caused by instruments used in obstetric operations, by stone in the bladder, by falling on sharp objects, by pessaries, and by cellular abscesses. Those due to malignant disease do not concern us here. Necrosis. Other causes.

4. **Symptoms and Diagnosis.** The symptoms are a constant or irregular involuntary discharge of the urine, excoriation of the parts, concretions of urinary salts in the vagina and on the vulva, and the symptoms of the accompanying vaginitis and vulvitis. Incontinence. Excoriations, concretions, Inflammation.

Large fistulæ are readily discovered by the vaginal touch on account of the deficiency in the urethral, anterior vaginal or cervical walls, and the cicatricial contraction as well as retraction of the vaginal walls. The examining finger enters the bladder. Small fistulæ may be seen by placing the patient in the left-lateral or knee-chest position and drawing the perineum well back. Sometimes it is necessary to inject water colored by milk, picric acid, indigo, etc., into the bladder, and watch for its place of exit. Touch. Left-lateral position. Injections.

5. **Prognosis.** Small and medium-sized fistulæ are as a rule curable by operation. Large ones are exceptionally incurable on account of the impossibility of bringing together the Exceptionally incurable.

Spontaneous cure.

edges, or of covering the defect. Fistulæ not connected with the loss of tissue often heal spontaneously.

Paring edges.

Deep sutures.

Avoid vesical mucous membrane.

6. **Treatment.** The treatment consists in paring the edges of the fistula to the extent of removing, if possible, the overlying cicatricial tissue as far as but not including the edges of the vesical mucous membrane, and in uniting them with deep sutures that do not include the mucous membrane of the bladder (J. Marion Sims).

Split septum.

Sutures.

In some cases it is possible to split the septum all around, forming a vaginal and vesical flap, instead of paring it, and to bring the raw surface formed by the separated flaps of one side in contact with that of the other side. The sutures should be introduced just under the vaginal edges, and passed deeply into the tissues on either side in order to obtain a firm hold. By this method the sacrifice of tissue is avoided.

Separation from vagina or uterus.

Vaginal edges.

Cervix.

When the opposite edges of the fistula can not be approximated, the vagina can be incised across it, and the bladder be extensively separated from the vagina or even from the uterus (Mackenrodt), and the bladder wound be sutured separately by buried silkworm-gut or catgut sutures. The edges of the vaginal wound can then be completely, or only partly approximated, as the conditions may allow.

Preparatory douches.

Concretions.

The vagina should be douched with a normal (0.06 per cent.) solution of chlorid of sodium four or five times daily for some days beforehand, and all concretions be removed by the finger from the vulva or vagina whenever found.

Cicatrices.

Bag.

Incisions.

Cicatricial contraction of the vagina interfering with access to the parts may be overcome by the introduction for several days before the operation of rubber bags that are kept forcibly distended. The dilation may be facilitated by several small incisions made across the cicatrices. Jobert de Lamballe recommended making deep incisions at the time of the operation to relieve the tension on the sutures.

The steps of Sims' operation are as follows : Sims' position. Catch up the edges of the fistula with the tenaculum, and pare the edges, as far as but not including the mucous membrane, of the bladder, all around, with scissors or a bistoury, to the extent of producing a raw edge ¼ of an inch, or a little over ½ of a cm., wide, and beveled from the vesical mucous membrane outward. If sufficient tissue is removed the raw edges will bleed freely. Beginning at the most remote portion, introduce silkworm-gut sutures ¼ of an inch, a little more than ½ of a cm., from the raw edge, and bring them out in the raw surface just under (not including) the edge of the vesical mucous membrane. Introduce them again into the raw surface opposite, just under the vesical mucous membrane, and bring them out in the vagina a little more than a centimeter from the raw edge. Douche the bladder. The edges must be carefully approximated as the sutures are tied, and, if necessary, a few superficial ones used. One or two sutures introduced farther from the edges of the wound than the others are sometimes required to relieve

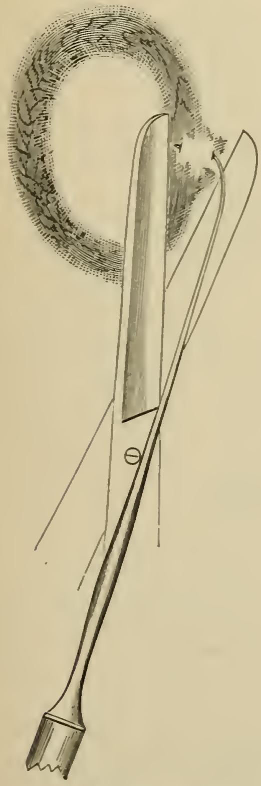


FIG. 129.—METHOD OF PARING THE EDGES.

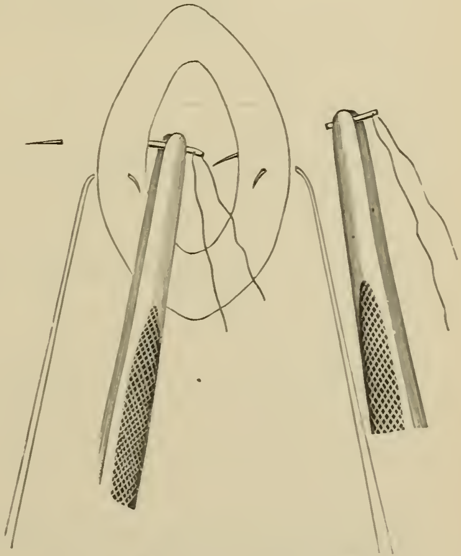


FIG. 130.—METHOD OF PASSING THE NEEDLE.

the traction upon them (Simon). Test the sutures by filling the bladder and compressing the urethra.

The instruments required are a Sims speculum, tenacula, Emmet's angular scissors, sponge holders, needle-holder, short needles with round point and slightly curved on the end, uterine sound, vulsella, a self-retaining catheter, and silkworm-gut sutures.

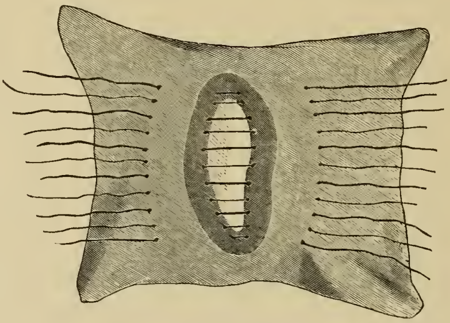


FIG. 131.—SUTURES PASSED.

Freund has succeeded in closing large fistulæ by opening the culde-sac of Douglas and drawing the fundus down into the vagina and stitching it over the defect. A hole is made in the fundus to allow of the escape of the uterine discharges. Kelly separated the bladder from the uterus, and brought the edges of the loosened bladder forward to the anterior vaginal edges of a large fistula, leaving the uterus in position.

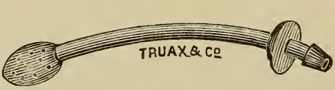


FIG. 132.—GOODMAN-SKENE'S SELF-RETAINING CATHETER.

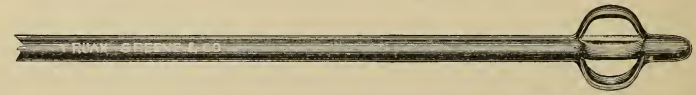


FIG. 133.—MALÉCOT'S SOFT-RUBBER SELF-RETAINING CATHETER.

Removal of urine.

7. The *aftertreatment* consists mainly in preventing a large accumulation of urine by drawing it every three or four hours,

Self-retaining catheter.

or in wearing a self-retaining catheter, for the first week. The catheter must be carefully watched, and removed and cleansed every twelve hours and whenever it becomes occluded.

Stools. Douches. In bed. Sutures.

The bowels should be moved at least every other day, and one per cent. carbolized vaginal douches be given twice daily. The patient should remain in bed for ten days. The stitches are left in place for two weeks.

Cervix to vaginal edges. Cervix split.

8. When the fistula extends along the edge of the *cervix*, the latter can be denuded in such a way that the vaginal edges are united to it (Figs. 134 to 136), or if one end reaches the cervix a wedge can be excised from the cervical tissue to form an upper angle that can be sutured (Figs. 137 to 139). When the fistula opens within the cervix (vesico-uterine), the anterior wall of the latter must be split up to it, the fistulous edges pared and closed, and then the cervical wound united as in ordinary cases of trachelorrhaphy. If the fistula is high up within the cervix, a transverse vaginal incision may be made in front of the cervix, the bladder be separated from the uterus as high as the peritoneal reflection (Follet), pulled down, and sutured. The cervical part of the fistula may be left alone if small, or

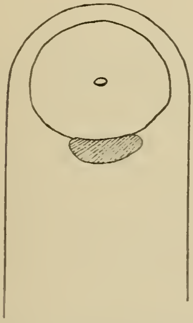


Fig. 134.—Fistula Extending Along the Edge of the Cervix.

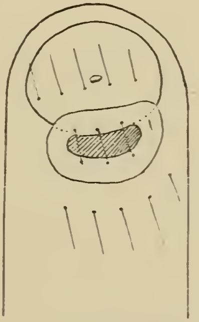


Fig. 135.—Same, with Sutures Passed. Edge of Cervix Denuded.

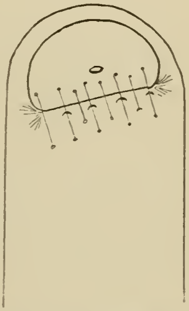


Fig. 136.—Same, with Sutures Tied.

it may be healed by splitting the cervix up to it, etc. When the anterior cervical wall is destroyed, it is sometimes necessary to unite the vaginal edges of the fistula to the posterior wall of the cervix, thus turning the uterine discharges into the bladder. When the fistula is too high up in the uterus to be reached by the cervical incision, the external os may be occluded by vivifying it and sewing it up.

Posterior cervical wall to edges.

Occlusion of os.

For large defects in the vesicovaginal septum Bozeman practised systematic traction upon the cervix until it could be brought down near the vaginal entrance, and sutured it behind the pubes to the anterior edges of the fistula. Peritoneal adhesions that resist this procedure should first be separated either by bimanual manipulation or by abdominal or vaginal section. When the fistula is large, and bleeds excessively upon being pared, a part can be pared and sutured before the remainder is attacked. In other cases it may be possible to close only a portion of a fistula at a sitting. In still other cases it may be necessary to raise vaginal flaps and draw them over the defect (A. Martin).

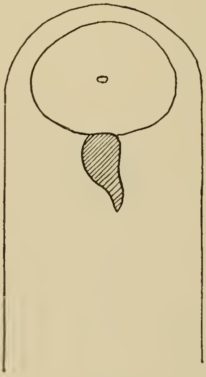


FIG. 137.—FISTULA EXTENDING TO EDGE OF CERVIX.

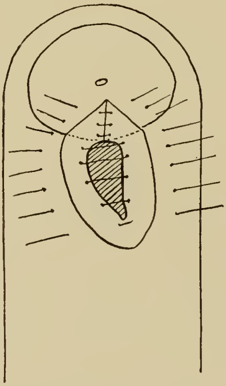


FIG. 138.—SAME, WITH WEDGE CUT FROM CERVIX AND SUTURES PASSED.

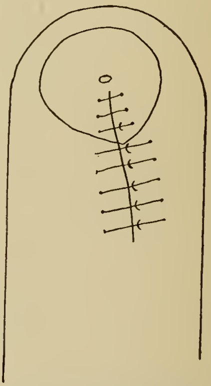


FIG. 139.—SAME, WITH SUTURES TIED.

9. When it is impossible to cure the fistula in any way, the vagina may be closed by colpocleisis (Simon). This is done by paring a strip of the vagina all the way around a short dis-

tance below the fistula, and uniting the posterior to the anterior vaginal wall by silkworm-gut sutures. A self-retaining catheter should be worn for a week or ten days afterward. Such an operation is apt to be followed by imperfect voidance of the urine, and a consequent irritation of the vagina. It should be looked upon only as a last resort.

CHAPTER IV.

URETERAL FISTULA.

1. *Ureterovaginal fistulæ*, *ureterocervical fistulæ*, *uretero-vesicovaginal fistulæ*, and *uretero-cervicovaginal fistulæ* have the same causes as vesicovaginal fistulæ. Definitions. Causes.

A *uretero-vesicovaginal* fistula originates in the same way as a vesicovaginal, the slough involving the lower end of the ureter where it runs obliquely through the vesical wall or near the vaginal wall. The slough may be so extensive as to involve a large part of the vesicovaginal wall as well as the ends of both ureters, forming a sort of urogenital cloaca (Deroubaix). A uretero-cervicovaginal fistula may be converted into a ureterovaginal fistula by cicatrization and closure of the vesical opening. A ureterocervical fistula is usually the result of a compression of the cervix, the lower end of the ureter, and the vaginal wall between the fetal head and the pubic bone, and a sloughing of these tissues. Cicatrization then closes the lower portion of the wound, or leaves a track from the ureter into the cervical cavity. *Ureterovaginal* fistulæ result from a slough of the vaginal wall and contiguous ureter, and sometimes also of the bladder wall, with subsequent closure of the vesical portion. They are, in rare instances, congenital.

2. A *ureterovaginal* fistula is usually small, with either abrupt or pouting edges, from which urine issues in small quantities or jets at frequent intervals. Size. Edges. Urine.

A uretero-vesicovaginal fistula may have a small oval or a large irregular vaginal opening near the cervix. By watch- Opening.

Flow. Orifice. Injection of colored fluid.

ing for small jets or an intermittent flow of urine at the edges of the wound, the position of the ureteral orifice can be discovered and a catheter introduced. The injection of a colored fluid into the bladder will cause it to appear in the vagina, and thus demonstrate the implication of the bladder.

Sound in ureter and cervix. Injection of fluid. Dilation of cervix.

In case of ureterocervical fistula, a sound or guide introduced into the ureter by way of the bladder may sometimes be made to enter the cervix, and be touched by a uterine sound passed into the cervix. Milk or a colored fluid may be injected into the bladder, to show, by its appearance or non-appearance, whether there be also a vesicouterine fistula. Dilation of the cervix sometimes exposes the opening and enables us to sound it for a short distance.

The introduction of a laminaria tent into the cervix not only dilates it, but it stops up the ureterocervical opening, and reveals the condition by causing symptoms of renal colic (Freund). Berard, by collecting the urine from the vagina and that of the bladder separately for a given length of time, and finding both quantities the same, concluded that the vaginal discharge came entirely from one kidney and the vesical from the other.

Operation. Denudation over sound. Sutures. Schedé method. Flap splitting. Pozzi's method.

3. The *treatment* of ureteral fistula is by operation. If a sound can be introduced from the bladder into the ureter and beyond the opening, the vagina may be denuded for ½ of a cm. ($\frac{1}{5}$ of an inch) all around the opening, and the edges be united by silkworm-gut sutures that embrace the tissues widely, but do not touch the ureteral mucous membrane. Schedé preserves a small zone of mucous membrane next to the fistula, making his denudations a short distance from it. If the parts permit of it, the edges of the fistula may be split, forming flaps that are turned up and sutured over the defect by transverse sutures. Pozzi makes a transverse vaginal incision over the fistula and extending a centimeter beyond it each way. He then makes two longitudinal incisions at either end of this first incision and raises vaginal flaps, which

are sutured so as to bring their broad surfaces in apposition over the fistula. He does not consider the introduction of a ureteral sound necessary.

Simon made an incision from the vagina into the bladder near the fistula, introduced a sound into the ureter through the artificial vesicovaginal fistula thus made, opened up that portion of the ureter which passed through the bladder wall, and kept it open by the daily passage of a sound between the edges until they had each cicatrized separately. The large opening thus made was subsequently closed by denudation and suture of the edges.

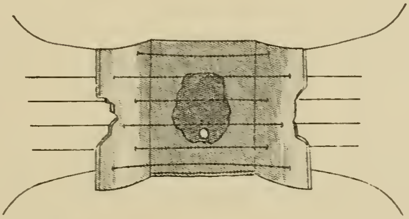


Fig. 140.—Pozzi's Operation for Ureteral Fistula.

CHAPTER V.

FECAL FISTULA.

1. By fecal fistula we mean a communication between the rectum and vagina, the small intestine and vagina, or between the rectum and vulva or perineum externally. **Definition.**

2. The **causes** include those of urinary fistula. A complete laceration of the perineum, with union below and non-union above, direct injury by obstetric instruments, abscess in the connective tissue, and stricture and ulceration of the rectum, may cause it. Vaginal hysterectomy for inflammatory disease has caused it a few times. **Of urinary fistula.** **Injury, abscess, stricture, ulcer.** **Operation.**

Of cause. Flatus. Inflammation. Induration, discharge.

3. The **symptoms** may at first be those of the cause, but later the passage of flatus and feces per vaginam, with more or less vaginitis and vulvitis, are the chief ones. In cases resulting from abscess, perineal induration and purulent discharges complicate the condition, as in anal fistula.

Palpation, inspection. Injection.

4. The **diagnosis** is made by the discovery of the fistula, either by palpation and inspection in the dorsal position, aided by an anterior vaginal retractor, or by the injection of a colored fluid into the rectum and watching for its place of exit.

Dilate sphincter.

5. The **treatment** varies according to the position of the fistula. In all cases the sphincter ani should be widely dilated.

Split perineal body, etc. Complete perineorrhaphy.

If the fistula is near the sphincter, or in the perineal body, the tissues should be split in the median line, from the fistula out, through the perineum and sphincter. The rectovaginal septum thus exposed is then split a short distance beyond the sphincter, and the wound closed as in Tait's perineorrhaphy.

Flap-splitting perineorrhaphy. Vagina separated. Upper suture.

When the fistula is a short distance above the sphincter, the latter should not be disturbed, but a Tait's flap-splitting perineorrhaphy be performed as for partial laceration, the vagina being separated from the rectum for a short distance beyond the rectal opening. The upper perineal suture should reach the rectal opening, and thus support the tissues over it.

Vaginal denudation. Splitting septum. Incision of sphincter.

When the fistula is situated too high to be reached by a perineorrhaphy we can usually heal it by making a wide vaginal denudation over the rectal defect, and taking deep sutures. In favorable cases the rectal and vaginal walls may be separated and the flaps united as in Tait's perineorrhaphy. As a last step it is well to incise the sphincter ani posteriorly.

The preparatory and aftertreatment are the same as for complete perineorrhaphy (chap. II, par. 12; also part I, chap. II, par. 8, small type).

Semicircular or crescentic denudations, with the suturing of a vaginal flap over the rectal opening, has proved successful.

Segond, in cases that can not be cured by a vaginal operation, dilates the sphincter ani widely, makes a circular incision through the mucous membrane two or three millimeters beyond the margin of the skin, separates the rectum up to and beyond the fistula, draws down the loosened rectum until the fistula reaches the edges of the skin, amputates the rectum beyond the fistula, and sutures the raw edges of the upper portion to those of the anus with silkworm-gut sutures. After the operation a rubber tube wrapped in iodoform gauze should be placed in the anus and kept there for a few days.

Description.

6. **Enterovaginal fistula** is a communication between the colon or small intestine and the vagina, and is usually situated in the posterior fornix.

During labor.

Ileum.

Operations.

Tumors, etc.

It is more often *caused* by a laceration of the posterior vaginal wall during labor, and subsequent necrosis or ulceration of a contiguous adherent intestine, ordinarily the ileum. The separation of an adherent pus tube or suppurating ovary, or injury by instruments, during a vaginal operation, is an occasional cause, although such fistulæ are apt to be small, and often heal spontaneously. Suppurating ovarian tumors, hematomas or hematoceles have in rare instances opened into the bowel and then into the vagina.

Feces per vaginam.

Character of discharge.

7. The chief *symptom* is the passage of feces per vagina. If the fistula involves the small intestine the discharge will be thin, and will appear two or three hours after a meal. The higher the fistula the thinner will be the discharge, and the more imperfect the digestion of the particles of food contained in it. If the intestinal opening is in the cecum, the discharge will be more homogeneous and somewhat thicker, while if it comes from about the sigmoid flexure it will be distinctly feculent and sometimes formed.

General symptoms.

Debility, emaciation, amenorrhea, and exhaustion are the usual results of uncured fistulæ involving the small intestines.

Examination.

A careful examination with a speculum or vaginal retractors

Free passage into lower bowel.

is sometimes necessary to discover a small fistula. An examination by the finger, or with a blunt instrument, will sometimes enable us to determine whether the feces have free passage into the lower portions of the bowel or whether they are all, or nearly all, turned into the vagina, forming an artificial anus. The discharge of part of the feces per anum also aids in determining this point.

Per anum

Cautery.

Divide septum.

Clamp.

Close edges.

8. *Treatment.* Very small fistulæ may sometimes be cured by cauterization. In treating large fistulæ, it is necessary to divide any intestinal septum or spur that may prevent the onward passage of the contents of the bowel beyond the vaginal opening, or else to cause its necrosis by clamping it for a few hours in a pair of forceps. After this the fistulous edges are to be denuded and closed with the same care as those of urinary or rectal fistulæ.

Abdominal section, and suture.

Anastomosis, etc.

If this is not practicable, the abdomen may be opened, the adhesions separated, the fistula resected and closed by suture. When a large part of the intestine is destroyed a resection and end-to-end anastomosis of the bowel may be done with the Murphy button or by suture; or, if such be impossible, the upper end may be inserted into the colon or united to it by lateral anastomosis.

Casamayor introduced one branch of a clamp into the fistula and another into the rectum, and clamped the tissue between the fistula and rectum, thus causing necrosis and communication of the fistula with the rectum. He subsequently closed the vaginal opening. The clamps, of course, were so constructed as not to press upon the tissues below the parts to be opened up. Verneuil proposed to perforate the rectovaginal septum, and also the ileorectal septum, pass a rubber tube through them, and tie it around the intervening tissue. Simon proposed to make a large opening between the vagina and rectum, and then close up the vagina (colpocleisis).

CHAPTER VI.

LACERATION OF THE CERVIX.

Laceration. Rupture.

1. **Definition.** By laceration of the cervix we mean one or more tears into or through its walls. When the tear does not involve the external os, but goes entirely through the walls of the cervix above the vaginal junction, it is classed as a rupture of the uterus.

Single or multiple. Location. Varieties. Internal.

2. **Varieties.** Laceration of the cervix may be single or multiple, and may occupy any or all portions of its circumference. The most common varieties are the lateral, called unilateral if single and bilateral if on both sides, and the stellate, which consists of several tears radiating from the cervical cavity out in different directions. Internal lacerations are longitudinal lacerations or fissures within the cervical cavity that enlarge the cervical cavity without involving tissues beyond the external os.

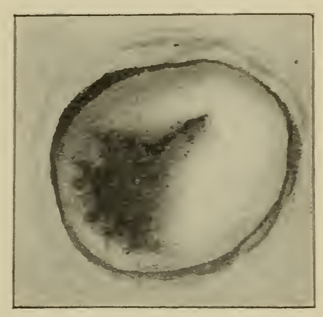


FIG. 141.—UNILATERAL LACERATION OF THE CERVIX. (*After Mundé and Thomas.*)

An infinite variety of lacerations are met with. They may be anterior or posterior, or they may take an oblique or curved direction; they may extend into the vaginal fornices, or they may be transverse (forming flaps), or annular, removing the entire rim of the cervix. Sometimes large vaginal rents extend from the cervical tears and open up the pelvic connective tissue or extend into the bladder. The vaginal lacerations heal by cicatrization, leaving palpable scars.

From labor. Factors.

3. **Etiology.** The greater majority of cervical lacerations take place during labor. A large head, a small or diseased cervix, premature rupture of the membranes, quick labor, malposition of the fetus, artificial dilation of the cervix either

in labor or in abortion, pulling upon the rim of the partly dilated os with the finger, pressure of the cervix between the head and pubes, etc., are the ordinary factors.

Operations. Operations for dilation or incision of the cervix may also give rise to it.

Laceration occurs in nearly all first labors, but the majority are slight and apt to heal by adhesion of the surfaces, or they may contract so as to be of but slight importance. About one-third of all parous women have, or have had, an old laceration.

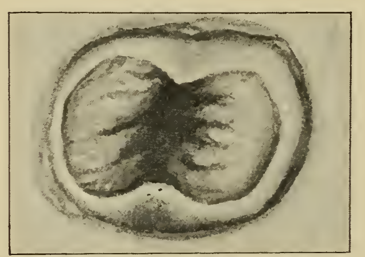


Fig. 142.—Bilateral Laceration of the Cervix, with Eversion of the Cervical Mucous Membrane. (*After Mundé and Thomas.*)

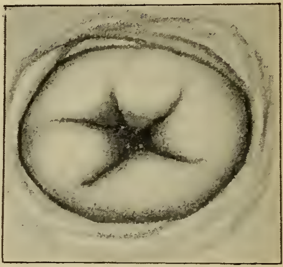


Fig. 143.—Multiple Stellate Laceration of Cervix. (*After Mundé and Thomas.*)

Lochia. 4. **Pathology.** When the laceration is of considerable extent, the lochia, which bathe the edges, usually prevent Ulceration complete union, and in septic cases entirely prevent it. Ulcerated surfaces remain upon which Cicatrizations. cicatricial tissue forms that fills the angles and in contracting interferes with the normal Circulations. circulation of the cervix. Small branching lacerations may produce cicatricial bands extending into the flaps and Glands. constricting the orifices of the glands. The ulcerated surfaces Infection. become infected sooner or later, and in turn infect the mucous Erosion, etc. follicles. These changes result in erosion, eversion, and often in follicular degeneration of the cervix. Many cases, however, Normal conditions. recover without distortion, and the cervix may become normal except for the fissure corresponding to the laceration. (See part VII, chap. VII, par. 1, 2, 3, and 4.)

Complications.

Endometritis, subinvolution, retroversion of the uterus, as well as displacement of the cervix by the contraction of vaginal scars, are frequent complications.

Cellulitis.

The most characteristic result is cellulitis, due to infection of the connective tissue. This may consist of a hard, temporary exudate extending from the tear to the pelvic walls, or of an exudate that rapidly breaks down and forms an abscess.

Of pathological conditions. Pelvic symptoms. Digestive and nervous.

5. The **symptoms** are those of the pathological conditions mentioned above. Backache, a bearing-down sensation in the pelvis, leukorrhea, metrorrhagia, derangements of digestion, and nervous symptoms are the most usual ones.

Examination. Fissures felt. Eversions. Cicatrices. Internal lacerations.

6. The **diagnosis** of laceration is made by both the digital and speculum examination. The finger recognizes the fissure or fissures that extend through the rim of the os into the substance of the cervix. When there is eversion, the cervix seems, at the first touch, enlarged with but slight lateral lacerations, but upon feeling around the cervix the finger glides over the edges of the everted lips to the natural-sized cervix above. From one side, or both, vaginal cicatrices can sometimes be felt extending laterally or anteriorly along the lateral vaginal wall. Internal lacerations give the cervix a relaxed, flabby character.

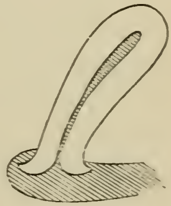


FIG. 144. — BILATERAL LACERATION OF THE CERVIX WITH EVERSION. SIDE VIEW. (Schematic.)

Not visible though speculum. Closing of speculum. In Sims' position.

Upon examination with the bivalve speculum, the pathological changes in the cervix are apparent, but the extent of the laceration is not seen, because the lips, if not already everted, are drawn apart by the speculum, and the angles are partly concealed in lateral vaginal folds. However, by closing the speculum upon the cervix, the labia are brought together, turning in what seemed to be the end of the cervix, until the surfaces first seen disappear from sight. When examined in the left-lateral position, through Sims' speculum, the lips may be everted and inverted at pleasure by catching each with a tenaculum, and thus the extent of the laceration be determined.

Immediately after labor the cervical walls are thin, flabby, and relaxed, and the recognition of laceration is difficult. Dr. John Bartlett discovered that he could always recognize them by introducing two fingers into the vagina, with one finger within the enlarged rim of the cervix and the other against the outer or vaginal side. He thus grasps the cervical walls between the fingers, and carries them around the entire circumference, and is able to detect each deficiency as it is passed.

No bad results.

7. **Prognosis.** Many lacerations produce no bad results. When erosion and eversion have continued a long time, recovery can not be expected, except by gradual inflammatory obliteration of the follicles, or by senile atrophy. Treatment will often apparently cure the disease, but it is liable to recur. Fortunately, a perfect cure can usually be attained by a plastic operation. When there is considerable glandular enlargement with erosion and extreme vascularity, there is danger of malignant degeneration.

Long-standing cases.

Treatment.

Operation.

Malignancy.

Immediate repair.

8. **Treatment.** The immediate repair of lacerations that originate in childbirth is not usually undertaken unless the uterine artery is torn and bleeds. In that case a trachelorrhaphy acts as a hemostatic. If the conditions for operating are not unfavorable, deep lacerations should always be repaired within a few hours of labor.

The patient should be placed on a table in the dorsal position, with knees separated and bent over her abdomen. A short retractor holds the perineum down, and the cervix is drawn to the vulva by tenaculum forceps. The blood should be wiped out, and the parts douched off with a 1 : 2000 solution of corrosive mercuric chlorid. The edges of the laceration, if ragged, should be trimmed with scissors, and the parts properly coapted. Then a needle about an inch (three cm.) long, with a slight curve near the point, and armed with coarse sterilized catgut, should be introduced about one cm. (⅓ of an inch) from the edge of the wound opposite the upper angle, and emerge at the edge of the endocervical mucous membrane, then be introduced at the mucous edge opposite, and emerge at a point on the cervix opposite the first point of introduction. This should be tied tight enough to stop the bleeding. Similar stitches should be placed lower down and about $\frac{1}{5}$ of an inch (five mm.) apart, until the laceration is closed. Chromicized catgut makes the best suture material, because it fulfils the requirements and does not cut the softened and more or less bruised cervix.

The vagina and cervix should be irrigated again with the antiseptic solution, and then with plain sterilized water. The douches should be repeated twice daily.

In view of the fact that these lacerations heal so readily when properly united, it would seem unsurgical not to thus unite all deep lacerations whether they bleed or not, provided aseptic preparations can be had. The time is undoubtedly near when such will be recommended. The operation is so easy that the only surgical talent necessary is an appreciation of surgical cleanliness.

The assistants required are an anesthetizer, an assistant for each knee, and a nurse. The instruments needed are vaginal retractors, needles, scissors, vulsella, a needle-holder, and two sponge holders.

Cure inflammation. Erosion. Cystic follicles. Subsequent complaint. Excision.

9. The *preparatory treatment* necessary for the successful performance of an operation for an old laceration consists in removing the inflammation (part VII, chap. VII, par. 11, 12, and 13). In case an ordinary trachelorrhaphy is contemplated, the erosion should be cured and all cystic follicles destroyed. If this is not done, the patient may complain more after the operation than before. When, however, the diseased tissues are all to be excised, such preparatory treatment is unnecessary, for the diseased tissue is to be cut away.

Surrounding inflammation.

All pelvic inflammation outside of the uterus should be cured, or the operation may make it worse, or may result in a failure of the parts to unite.

Emmet's operation. Position.

10. The ordinary operation, *trachelorrhaphy*, also called Emmet's operation, consists in paring the edges of the laceration and uniting them by sutures. It may be done either in Sims' or in the dorso-sacral posture (Fig. 3).

Vaginal entrance. Cervix held.

The vaginal entrance is held open by Sims' speculum, or by retractors if the patient is on her back; the cervix is pulled as near the vulva as practicable without using force, and held there by a sharp hook or tenaculum forceps in the hands of an assistant. By drawing the cervical walls together with two tenacula, the operator judges of the shape and extent of the tear. He then hooks up the parts a short distance above the lower end of the tear, and with knife or scissors cuts off a strip of tissue along the edge of the tear, and extending up to the angle. He may then, with Emmet's curved scissors, continue denuding the strip across the angle and down the other side, removing all in one piece; or he may commence the denudation of the second side of the tear at the lower end, and denude up the edge to meet the first strip under the cicatricial plug in the angle. Another way is first to split the cicatricial plug or angle as deep as necessary to get the healthy tissue, and with a knife denude from the angle down each side of the tear. All cicatricial tissue that escapes the first denudation must be hooked up

Extent of tear.

Denudation.

Methods.

With knife.

Cicatricial tissue.

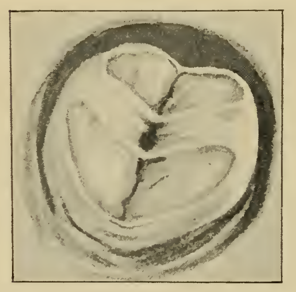


Fig. 145.—Lacerated Cervix after Denudation. (*After Skene.*)

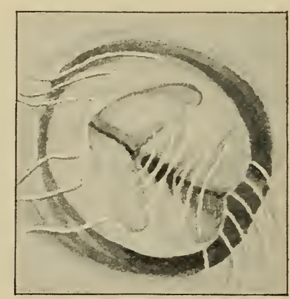


Fig. 146.—Same as Fig. 145, with Sutures Passed.

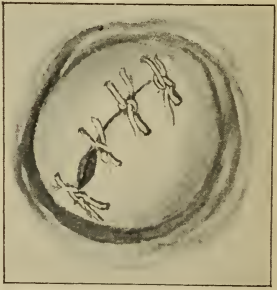


Fig. 147.—Same, with Sutures Tied.

Opposite side.

with a tenaculum and cut away. If another laceration is to be operated upon at the opposite side, it should be denuded before any sutures are introduced.

Sutures. **Disinfection.** **Tieing.** **Lower suture first.** **Advantages.**

In uniting deep lacerations in a large hardened cervix, the sutures are introduced at the upper angle of the wound as recommended in paragraph 8 (small type), but should not be tied until all are passed. Then the parts should be thoroughly disinfected with a 1 : 2000 solution of corrosive mercuric chlorid, or the sutures be tied under constant irrigation with the same. The upper one should be tied first, and then the next, and so on. If the cervix be small and soft, and the needle can be made to penetrate both flaps with one thrust, then each suture may be tied as soon as passed. Sometimes the parts can be united more quickly and in better shape by introducing the lower suture first and tying it. The surfaces then retain their position, and the other sutures, each with one sweep of the needle, can be accurately placed and quickly tied.

Packing. **Douche.** **Sutures.**

The vagina is loosely packed with gauze, which is to be removed on the third day. After that a 1 : 2000 corrosive chlorid douche should be given twice daily until the sutures are removed. Silkworm-gut sutures ought to be left in place two weeks, but may be left longer without harm.

In bed.

The patient is kept in bed from six to eight days, but should remain rather quiet for another week. She may sit up in bed to urinate.

When both sides are denuded a strip of mucous membrane must be left between them wide enough to make a good cervical canal. If the circular artery be wounded it will be readily controlled by the upper suture.

Silkworm-gut or prepared catgut (part I, chap. II, par. 5) may be used. The ends of silkworm-gut may be left long to facilitate their removal, those of each row of sutures being tied together.

The instruments needed are a Sims' speculum and depressor, or one posterior and two lateral vaginal retractors ; a sharp hook or tenaculum forceps; two uterine tenacula; a pair of uterine scissors; Emmet's full-curved scissors, or a knife; straight, sharp-pointed needles, one inch (2.5 cm.) long, slightly curved on the end; silkworm-gut sutures; uterine sound; two fountain syringes or douche bags with glass points, one for the antiseptic solution and one for plain sterilized water.

Schroeder's method.

Denudations.

Incision of angle.

Simple incision.

11. When the cervix is so extensively diseased that the denudation of an ordinary trachelorrhaphy does not remove all of the diseased tissue, *Schroeder's* method is preferable. This consists first in making the lateral denudations, and then incising the angles as far as the vaginal junction, or, if done for cases without lateral laceration, in making a simple incision on each side.

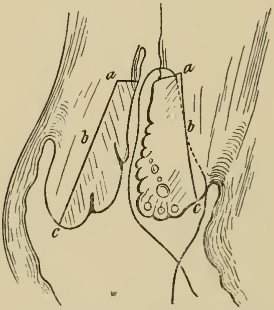


FIG. 148.—LINE OF INCISION IN EXCISION OF THE CERVICAL MUCOUS MEMBRANE. SIDE VIEW. (*Schroeder.*)

a, b, c. Line of the cervical incision.

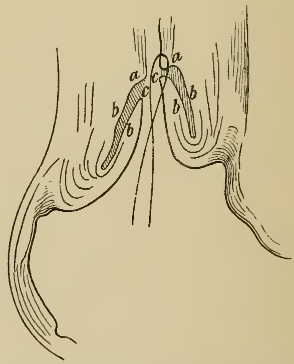


FIG. 149.—SAME AS FIG. 148, WITH THE TISSUE REMOVED AND FLAP DRAWN UP BY THE SUTURES (*Schroeder.*)

Transverse incision.

Removal of mucous membrane.

The lips are then widely everted, and the mucous membrane of the lower lip cut squarely across at or near the upper angle of the incision. The mucous membrane and underlying diseased tissues between the raw surfaces are dissected off with a knife as far down as the mucous membrane is diseased (Fig. 148).

The mucous membrane at the lower edge of the raw surface is united by two or three silkworm gut or catgut sutures to the membrane at the upper edge, thus folding the cervical wall and turning healthy membrane into the cervix (Fig. 149). The same is done to the upper lips, and then the angles are trimmed and united as in ordinary trachelorrhaphy.

Sutures.

Upper lips. Angles.

The instruments required are the same for trachelorrhaphy, and the aftertreatment is the same.

As for trachelorrhaphy.

PART SIX.

DISPLACEMENTS.

CHAPTER I.

DISPLACEMENTS OF THE UTERUS.

Relation to pelvic axis.

1. The **normal position** of the uterus is in the center of the pelvis, with the fundus in front of the axis of the superior strait and the cervix behind it.

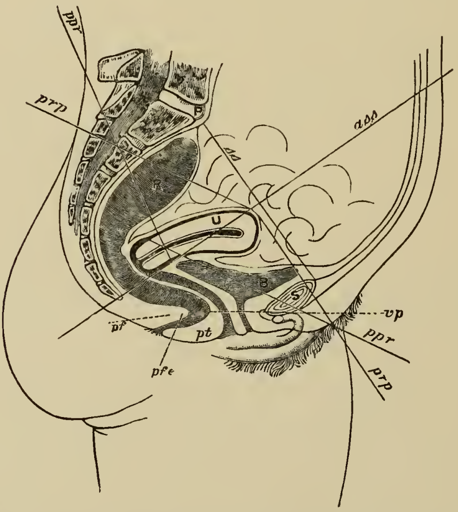


FIG. 150.—NORMAL POSITION OF FEMALE PELVIC ORGANS IN THE VIRGIN.
U. Uterus. B. Bladder. R. Rectum. *pt.* Perineal triangle. *pf.* Pelvic floor. *pfe.* Pelvic floor edge. S. Symphysis pubis. P. Promontory of sacrum. *ppr.* Plane of pelvic roof. *prp.* Plane of pelvic roof projection. *ss.* Superior strait. *ass.* Axis of superior strait.

Long axis.

Physiological displacements.

The long axis of the uterus forms a slight curve, whose concavity faces forward and downward. Its supports are not rigid ones, and the displacements of the fundus backward by a full bladder, or of the cervix forward by a loaded rectum, are *physiological* variations.

Connective tissue.

2. **The Normal Supports.** When no extra pressure is brought to bear upon the uterus it is entirely supported by the surrounding connective tissue. As the peritoneum is reflected over the uterus it is thrown into folds which include a portion of the connective tissue, and are called the sacro-uterine and broad ligaments, and the vesico-uterine folds. These, together with the round ligaments and the vesico-vaginal septum, or pubo-uterine ligament, constitute the *suspensory supports*.

Peritoneum.

Ligaments

The sacro-uterine ligaments hold the cervix back of the axis of the superior strait, while the round ligaments, gravity, and the intra-abdominal pressure combine to hold the fundus forward. All of the ligaments, particularly the round ligament, contain muscular fibers continuous with those of the uterus. (Bayer.)

Pelvic floor.

3. When pressure is brought to bear upon the uterus, such as straining in lifting, it is forced down on the pelvic floor (part II, chap. III, par. 2), where its lower end rests until the pressure ceases, and it is then raised to its previous position.

Perineum.

At the pelvic outlet the muscles and fascia of the perineum proper act merely as supplementary supports to the uterus by closing the vaginal, rectal, and urethral outlets.

Varieties.

4. **Classification.** Six kinds of displacements are recognized—Simple Displacements, Versions, Flexions, Prolapse, Torsions, and Inversions.

Of secondary importance.

Simple displacements are changes in the location of the uterus without any significant change in its axis. With the exception of lapsus (chap. V, par. 1), they are not of sufficient intrinsic importance to call for a separate consideration, and will only be referred to in their relationship with the more important pathological conditions upon which they depend.

Change in the long axis.

Varieties.

5. **Versions** are displacements involving a change in the long axis of the uterus. They are: (1) a turning forward of the fundus and backward of the cervix, called *Anteversion;* (2) a turning backward of the fundus behind the axis of the superior strait, and a turning forward of the cervix in front of the axis, called *Retroversion;* and (3) tipping sideways, called *Dextro-* and *Sinistroversion*, or right- and left-lateral versions.

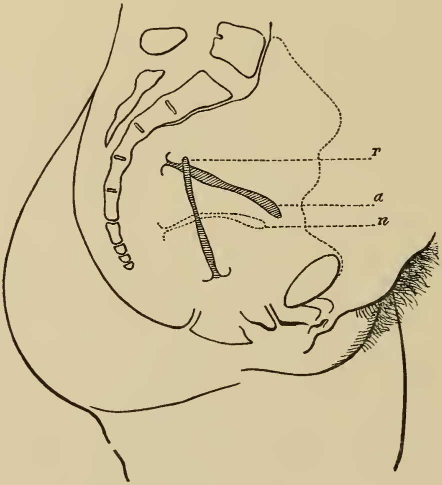


FIG. 151.—ANTEVERSION AND RETROVERSION. (*B. S. Schultze.*)
n. Normal position of uterine cavity. *a.* Anteversion. *r.* Retroversion.

Change of normal curve.

Varieties.

6. **Flexions** are deformities of the uterus involving an increase or alteration in the normal slight anterior curve of the long uterine axis. They are: (1) an exaggeration of the normal anterior curve, called *Anteflexion;* (2) a reversal of the normal curve, called *Retroflexion;* and (3) a bending sideways, called *Dextro-* and *Sinistroflexion*, or right- and left-lateral flexion.

Lateral versions and flexions are nearly always symptomatic of pelvic inflammation and tumors, and will not be given a separate description.

Toward pelvic outlet.

Stages.

Degrees of procidentia

7. **Prolapse** is a displacement of the whole uterus in the direction of the pelvic outlet. There are two stages: (1) a simple descent in the axis of the pelvic outlet, with approach of the cervix to the vaginal outlet, called simple *Prolapse;* and (2) a protrusion of the uterus through the vulva, called *Procidentia.* Procidentia is said to be *partial* when only a portion of the uterus is outside of the vulva, and *complete* when the entire uterus is outside.

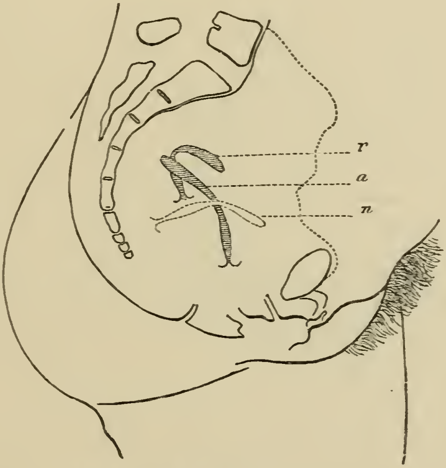


Fig. 152.—Anteflexion and Retroflexion. (*Schultze.*)
n. Normal position of uterine cavity. *r.* Anteflexion. *a.* Retroflexion.

Twisting.

8. **Torsion** is a twisting of the uterus on its long axis, and depends upon conditions similar to those attending lateral displacements.

Sinking in of upper part.

9. **Inversion** is a sinking of the fundus or upper part of the uterus into the cavity of the uterus or vagina, the organ being turned either completely or partially inside out.

Selection.

10. Selecting from the above classification such displace-

ments as demand a separate consideration, we have the following list:

Anteflexion.
Anteversion.
Retroflexion and Retroversion.
Prolapse, including **Lapsus and Procidentia.**
Inversion.

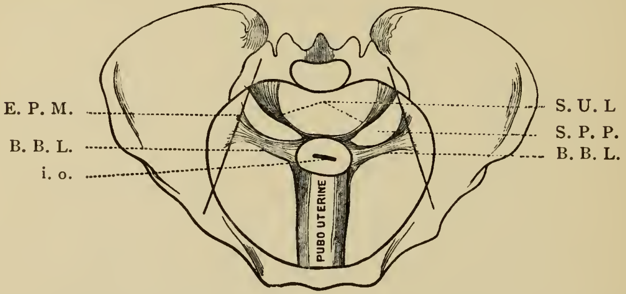


Fig. 153.—Uterine Suspensory Ligaments on a Level with Internal Os Uteri.
E. P. M. Edge of psoas muscle. B. B. L. Base of broad ligament. i. o. Section of uterus at internal os. S. U. L. Sacro-uterine ligament, surrounding the culdesac of Douglas. S. P. P. Left lateral sacral peritoneal pouch, behind broad ligament.

CHAPTER II.

ANTEFLEXION OF THE UTERUS.

Normal position of fundus.

1. **Mechanism.** The fundus leans normally over the bladder and vesicovaginal septum, or pubo-uterine ligament, in a position of slight anteflexion. When the sacro-uterine ligaments are too short, the cervix is held too high and too far back in the pelvis, and the fundus is forced by abdominal pressure and gravity down toward the bladder. If the uterus is straight and rigid, a simple downward and forward inclination beyond the normal will result, *i. e.*, *anteversion.* If the uterus is flexible, the body will be bent downward and for-

Sacro-uterine ligaments.

Pressure, etc.

Uterus rigid.

Uterus flexible.

ward by the same forces, while the cervix may also be bent slightly forward by traction or the resistance of the vaginal walls, forming *anteflexion* (Fig. 154).

Degree.

2. **Pathology.** When the degree of flexion is such as to interfere with drainage of the uterine cavity or impregnation, it is *pathological.* When the flexion is greater than normal, and is not straightened by the filling bladder, by menstrual erection, or by variations in the abdominal pressure, the constant pressure on the anterior wall produces more or less atrophy in it, while the posterior wall may become larger and thicker, partly from traction and partly from hyperplasia or chronic metritis, due to the imperfect drainage. In time the flexion becomes irreducible or *permanent* on account of the rigidity and want of symmetry of the walls.

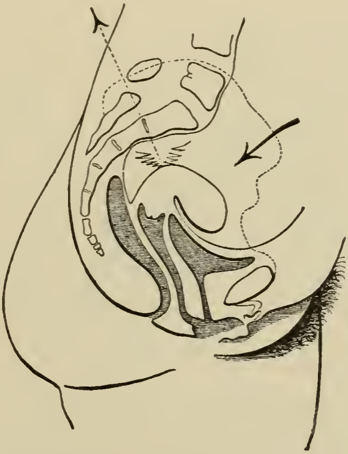


Fig. 154.—Pathological Anteflexion, caused by Short Sacro-uterine Ligaments. (*B. S. Schultze.*)

Atrophy and thickening of walls.

Irreducible.

Shortened sacro-uterine ligaments.

Asymmetry.

3. Shortening of the sacro-uterine ligaments may take place either from the contraction following parametritis posterior or from peritoneal inflammation about them. Sometimes the connective tissue under one of these ligaments is

Torsion.

Posterior wall.

contracted more than the other, and the base of the broad ligament of the same side is also contracted, drawing the cervix a little to one side, thus producing a slight torsion. The posterior wall of the cervix faces toward the side of the contracted sacro-uterine ligament.

Errors in development.

Cervix.

Fundus.

When the genital organs do not develop symmetrically or as fast as the pelvis, anteflexion is apt to result. The short sacro-uterine ligaments draw the upper portion of the cervix backward and upward, while the short, poorly developed vagina holds the lower end of the cervix forward, as is normal in young children. The cervix is thus bent forward into the vaginal axis, and is apt to be elongated and conical, while the poorly developed fundus is pressed over the bladder by abdominal pressure, as well as by gravity. This constitutes *puerile anteflexion.* (Schultze.)

FIG. 155.

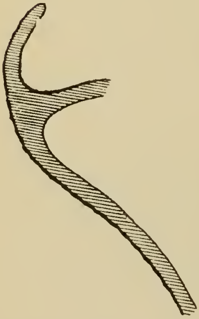


FIG. 156.

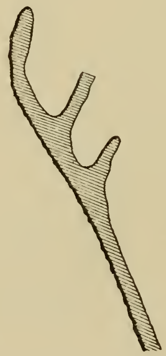


FIG. 157.

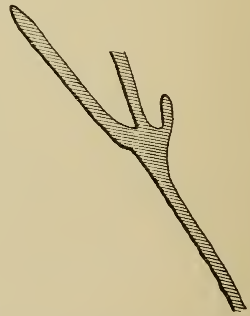


FIG. 155.—NORMAL INSERTION OF CERVIX INTO VAGINA IN ADULT (NATURAL SIZE).
FIG. 156.—APPROXIMATION TO THE CONDITION OF CHILDHOOD, OFTEN MET WITH IN VIRGINS.
FIG. 157.—NORMAL FORM OF CERVIX AND INSERTION INTO VAGINA IN CHILDHOOD. (*B. S. Schultze.*)

There may be all degrees of flexion of this kind, from that in which the cervix is in the same position as in childhood to that in which the cervix is drawn farther back, but still retains a slight forward curve.

Relaxation of ligaments.

4. Another variety of anteflexion is that in which, either

With retroversion.

from childbirth, debility, or other causes, the uterine ligaments have become relaxed after the flexion has become permanent. In such cases the anteflexed uterus falls into *retroversion* or *retroposition* in the culdesac of Douglas.

Sources.

Mechanical.

5. The **symptoms** may result (1) from mechanical interference with function, (2) from inflammatory conditions, or (3) from imperfect development. Dysmenorrhea, amenorrhea, irritability of the bladder, and torpor of the rectum are the most frequent mechanical ones. The symptoms of uterine or pelvic inflammation, such as backache, painful defecation, leukorrhea, or anemia, may in time become the dominant ones. Sterility is common. The dysmenorrhea in the earlier stages is of the kind described elsewhere as mechanical dysmenorrhea, but in time it becomes more like the inflammatory variety.

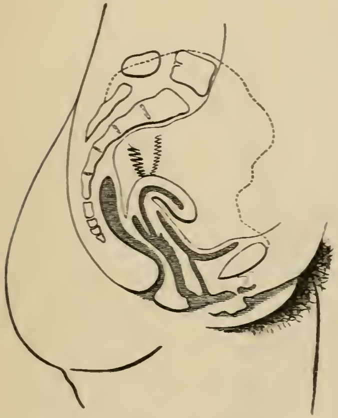


FIG. 158.—PUERILE ANTEFLEXION. (*B. S. Schultze.*)

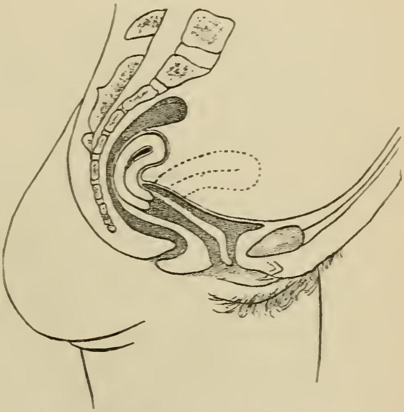


FIG. 159.—ANTEFLEXION WITH RETROVERSION OR RETROPOSITION.

Inflammatory.

Sterility.

Dysmenorrhea.

Examination.

6. The **diagnosis** depends almost entirely upon the physical examination.

Cervix.

The finger in the vagina will find the cervix well back in the pelvis, pointing forward almost in the axis of the vagina,

Angle of flexion.
Bimanual manipulation.
Flexibility.
Rigidity of ligaments.
Adhesions.
Cervix.
Ant. Vaginal Wall.
Post. Vaginal Wall.

and making an acute angle with it instead of the normal right angle. The angle of flexion can be easily felt, the cervix lying under and the corpus over the finger. Bimanual examination, with the thumb in the vagina and the forefinger of the same hand in the rectum, will enable us to bend and straighten the body on the cervix and determine their flexibility, and also the degree of rigidity and contraction of sacro-uterine ligaments, and whether the uterus is merely drawn backward by them or whether it is fixed by adhesions in the back part of the pelvis. In *puerile cases* the conical cervix is held forward in the pelvis by the short anterior vaginal wall, which is less than 2½ inches (seven cm.) long. The posterior vaginal wall is proportionately longer than the anterior. (Figs. 157 and 158.)

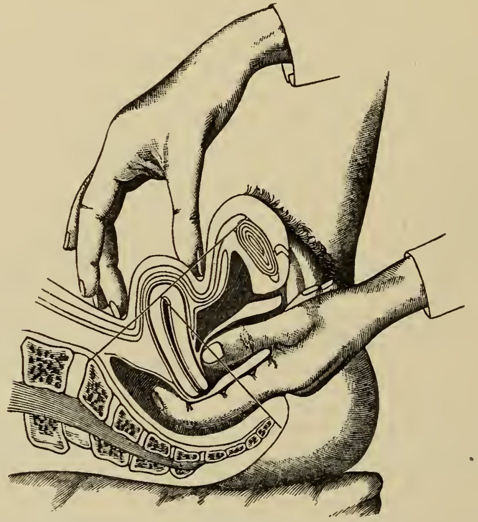


FIG. 160.—BIMANUAL RECTOVAGINAL EXAMINATION OF THE UTERUS.

Posterior wall of cervix.

Anteflexion with *retroversion* or *retroposition* is recognized by the fact that the cervix points toward the pubes, and its posterior wall can be traced back into the hollow of the sacrum as if there were a retroversion. But the finger in the rectum, either with or without the aid of bimanual palpation, recognizes convexity of the posterior wall of the uterus and detects adhesions if present. The fundus is far back and high up, and not easily felt. (Fig. 159.)

Convexity. Adhesions. Fundus.

It occasionally becomes necessary to use the sound to determine the direction of the canal. In such cases a flexible silver sound, or probe, well curved and used very gently, gives the best satisfaction.

Sound. Flexible.

The length of the anterior vaginal wall, or distance of the cervix from the vaginal outlet, is easily measured by placing the finger tip against the cervix *at the vaginal junction*, while the finger is raised against the anterior vaginal wall and the pubic arch. The subpubic ligament should normally impinge against the finger between the second and third joints. The place can be fixed by putting the nail of the finger of the other hand upon the point of impingement, and the distance measured after withdrawal. Normally it should be 2½ inches (seven cm.).

7. The **prognosis** is ordinarily good in young persons before the uterine walls have become rigid. In puerile cases, and in those of long standing, with rigidity or with peritoneal adhesions, it is bad. Relief of the worst symptoms can, however, in most cases be attained.

Young persons. Puerile cases. Rigidity, etc. Relief of symptoms.

8. **Treatment.** Parametritis posterior and adhesions from recent peritoneal inflammation are benefited by vaginal tamponade and hot douches. (See part I, chap. IV, par. 10; also part 7, chap. IX, par. 7.) The tampon next to the cervix should be saturated in a ten per cent. solution of ichthyol in glycerin. The cervix should also be kept systematically dilated, and the hyperplasia or metritis treated (part 7, chap. VIII and IX). Massage as described in part 7, chap. XII, par. 13 sometimes acts beneficially in cases of parametritis posterior in which the cervix is held well back and the retro-uterine tenderness has disappeared.

Tamponade. Medication. Dilation. Hyperplasia, etc. Massage.

Dilation and curettage. Sound. Repeated.

Old cases, with well-pronounced endometritis, rigidity of the uterus, and dysmenorrhea, require a thorough dilation and curettage (part 7, chap. VIII, par. 16), followed by the passage of a large sound once a week, or, if necessary, by repeated dilation and curettage.

Adhesions. Massage. Separation. Peritoneal section.

If there be adherent ovaries and tubes about the sacro-uterine ligaments holding the uterus back, these should, after all inflammatory reaction has subsided, be separated by pelvic massage (part 1, chap. V, par. 8, 9, and 10). If that prove inefficient, they may be separated under anesthesia, in one or more sittings, by the bimanual rectovaginal manipulation, or, if connected with an accumulation of pus in the pelvis, by a peritoneal section.

Pregnancy.

Impregnation following such treatment often brings about a complete, or at least a symptomatic, cure.

Puerile uterus.

In congenital cases the treatment recommended for puerile uterus may be of benefit (part 4, chap. III, par. 18).

Pessaries are, as a rule, more harmful than beneficial. The only indication for them is to support the uterus so as to prevent traction upon the tender sacro-uterine ligaments or peritoneal adhesions, and a tampon answers that purpose better. Soft rubber inflatable pessaries are the best ones if tampons are not available, but they should be removed and cleansed at bedtime, and reintroduced in the morning by the patient.

CHAPTER III.

ANTEVERSION OF THE UTERUS.

Subinvolution, etc. Puerperal origin. Cervix.

1. **Pathology.** Anteversion (Fig. 151 a) presupposes subinvolution, chronic metritis, or hyperplasia of the uterus, sufficient to prevent the occurrence of flexion. The subinvolution is nearly always puerperal, and thus occurs while the uterine ligaments are relaxed. When the ligaments contract, the cervix is drawn up toward the second sacral

vertebra, and the heavy fundus is forced by gravity and abdominal pressure down on the vesicovaginal septum. The uterus being rigid, the cervix points back toward the sacrum. The conditions outside of the uterus which constitute the causes are the same as in anteflexion. Fundus. Direction of cervix Conditions of anteflexions.

2. The **diagnosis** is easily made by the finger, which finds the hard and enlarged uterus lying over the vesicovaginal septum and the os pointing toward the sacrum. The lower end of the cervix is over three inches from the subpubic ligament. The anterior wall of the vaginal portion of the cervix makes an obtuse angle with the anterior vaginal wall. The bimanual examination demonstrates the inflexibility and hardness of the organ. By touch. Over vesicovaginal septum—os. Distance of cervix. Angle. Inflexibility, etc.

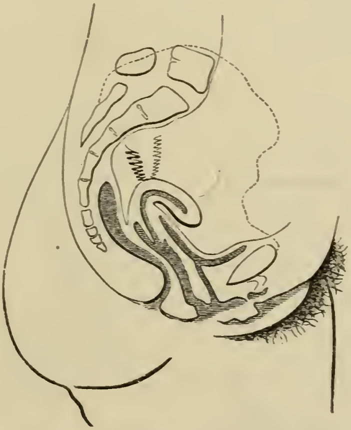


FIG. 161.—ANTEVERSION, DUE TO CHRONIC METRITIS AND PARAMETRITIS. POSTERIOR (*B. S. Schultze*)

3. The **symptoms** are the same as those of anteflexion, with greater tendency to vesical irritability and less tendency to dysmenorrhea. Anteflexion. Variations.

4. The **treatment** is the same as that of anteflexion, with the addition of the treatment of subinvolution (part VII, chap. IX, par. 7). Anteflexion and subinvolution

CHAPTER IV.

RETROFLEXION AND RETROVERSION OF THE UTERUS.

(*Alexander's Operation, Vaginal Fixation of the Uterus, Hysterorrhaphy, Separation of Adhesions.*)

Cervix forward. Full bladder. Straining, etc. Fundus backward. Result.

1. **Mechanism.** When the cervix uteri is displaced forward, the long axis of the uterus is approximated to that of the axis of the superior strait. If under these conditions the bladder be overfilled, or if the patient exert herself while she is bending forward, or if she strains at stool, the fundus is forced backward by abdominal pressure and gravity toward the hollow of the sacrum, resulting in retroflexion if the uterus be flexible, and retroversion if the uterus be rigid.

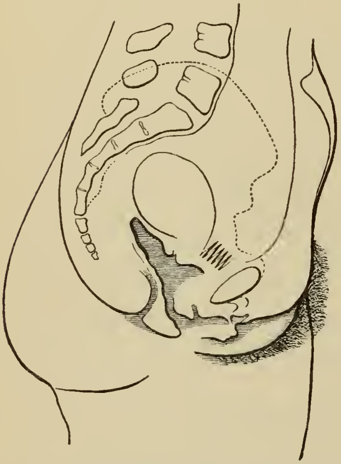


FIG. 162.—RETROFLEXION DUE TO ANTERIOR FIXATION OF THE CERVIX. (*B. S. Schultze.*)

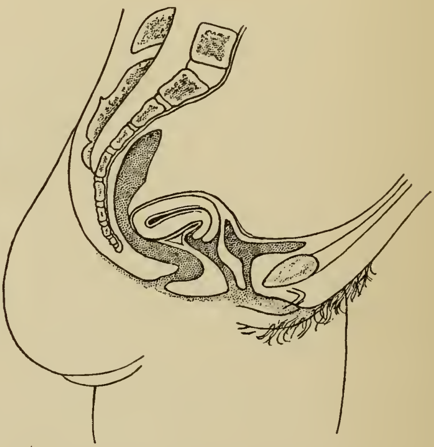


FIG. 163.—EXTREME RETROFLEXION OF THE CERVIX DUE TO INFLAMMATORY CONTRACTION ON THE POSTERIOR SURFACE OF THE UTERUS.

Uterus flexible. Position.

2. **Pathology.** The uterus may be of normal or exaggerated *flexibility*, and lie with the fundus bent back in the

culdesac of Douglas, forming a curve with concavity facing downward and backward (retroflexion), the sacro-uterine ligaments not being long enough to permit the cervix to straighten out. Changes similar to those described in the pathology of anteflexion may occur, with impaired function, metritis, hyperplasia, and permanent or irreducible flexion.

Sacro-uterine ligaments.

As in anteflexion.

In other cases the hyperplasia and *rigidity* precede the displacement. The uterus then remains straight, and does not allow the sacro-uterine ligaments to contract, and the position is one of retroversion.

Previous rigidity.

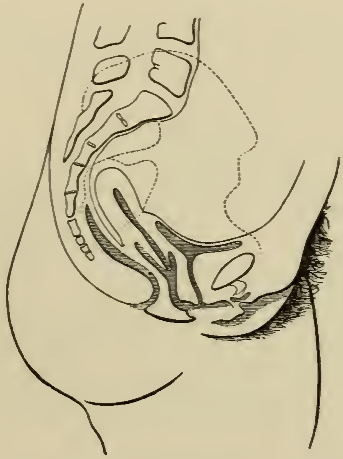


Fig. 164.—Congenital Retroversion. (*B. S. Schultze.*)

In another class of cases a permanent *anteflexion* has developed first, and the uterus takes the position of retroversion with anteflexion. (Fig. 159.)

Previous anteflexion.

In still another class the vagina remains *undeveloped* (congenital), or it undergoes senile atrophy, and the cervix is held so far forward by the short vagina that the fundus is tipped or pried back into the culdesac. The sacro-uterine ligaments are at the same time relaxed, and the uterus falls

Undeveloped.

Senile.

Cervix.

Fundus.

Sacro-uterine ligaments.

Position. Cervix. Corpus. Infantile.

back without flexion, or may be slightly anteflexed so as to fit in the concavity of the culdesac. The cervix is usually elongated and conical, and the corpus short or puerile. The infantile uterus is apt to be thus retroverted. (Fig. 164.)

Uterine walls.

Occasionally a primary enlargement of the anterior wall or shrinkage of the posterior wall may exist.

Surrounding inflammation. Fixed.

Surrounding peritoneal inflammation and exudates are often present, and the uterus is held in fixed retroversion or retroflexion without reference to its flexibility.

In a few cases a contraction of one of the broad ligaments not only prevents the fundus of a rigid uterus from leaning over the bladder, but it tips the corpus far enough back to enable the abdominal pressure to carry the fundus against the sacrum. The organ can be replaced by force, but it retroverts as soon as released.

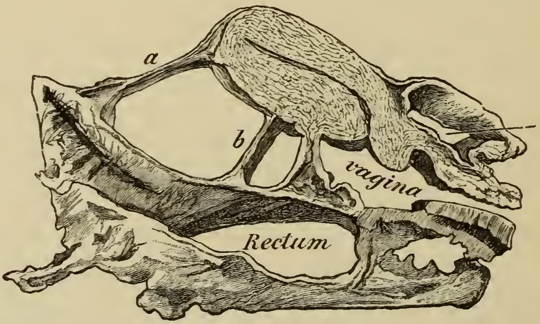


FIG. 165.—RETROFLEXION WITH ADHESIONS (*a* and *b*) BETWEEN UTERUS AND RECTUM. (*Winckel.*)

Relaxation of sacro-uterine ligaments. Causes. After labor. Vaginal entrance.

3. **Etiology.** The cause of 90 per cent. of cases is relaxation of the sacro-uterine ligaments (B. S. Schultze) due to constipation, general weakness, but particularly to post-partum conditions, such as lacerated cervix and vaginal fornices, getting up too soon, etc. The uterus remains too heavy after labor, and the uterine ligaments continue relaxed and subinvoluted from inflammatory changes starting in the uterus or cervix. Lacerations about the vaginal entrance,

and a sagging of the vesicovaginal septum, remove some of the normal support of the cervix, and also tend to drag it forward, while overfilling of the bladder forces the fundus back. Bladder.

Cicatricial contraction in the anterior vaginal wall, due to laceration or sloughing following labor (Fig. 162), contraction from senile atrophy, and a congenital shortness of the vagina cause the trouble by holding the fundus forward. (Fig. 164.)

Subinvolution of the anterior uterine wall, due to adhesion of placental tissue (E. Martin), as well as the contraction of posterior inflammatory exudates following lacerations of the cervix, puerperal endometritis, salpingitis, etc., may bend or turn the uterus backward and hold it there indefinitely.

4. **Symptoms.** A sudden displacement is usually signaled by a feeling of discomfort or pain in the pelvis, a desire to urinate and defecate, and sometimes by the symptoms of metritis and peritonitis. Constant pelvic discomfort is felt for several days. Sudden displacement.

5. Backache, irritability of the bladder, menorrhagia, and dysmenorrhea, which may last during the greater part of the monthly period, are ordinary symptoms of retroflexion and retroversion. These, together with leukorrhea, painful defecation and urination, dyspareunia, iliac, gluteal and sciatic pains, which are sometimes present, are ordinarily the result of an accompanying chronic endometritis, ovaritis, or peritonitis with adhesions. Ordinary symptoms. Other symptoms. Due to inflammation.

Pressure of the fundus upon the rectum or sacral plexus occurs in rare cases in which the uterus is enlarged and the pelvic tissues greatly relaxed. Compression of the veins beside the uterus, between the sacro-uterine ligaments and the edges of the uterus, sometimes causes pelvic discomfort, which is immediately relieved when the uterus is replaced. Pressure of fundus. Veins. Relieved.

Sterility is present in most cases of long standing, but is due to the associated disease rather than to the displacement. Long standing. Cause.

6. **Diagnosis.** In cases of retroversion the cervix will

Direction and distance of cervix. Fundus.

point toward the vaginal outlet, and the finger which touches the displaced cervix will impinge against the subpubic ligament at or below the second joint. The fundus will usually be felt behind the cervix, extending backward almost in a straight line.

Cervix. Corpus. Tumor or exudate. Bimanually Position of fundus. Per rectum.

In cases of retroflexion the cervix is usually slightly displaced forward, and the corpus can be felt in the posterior fornix, making an angle with the cervix. As it is possible that the body felt in the fornix may be a tumor or exudate attached to the uterus, or that a retroversion may exist with the fundus lying over the tumor or exudate, instead of between the sacro-uterine ligaments, it is better to examine bimanually in all cases. With two fingers in the vagina, and the other hand pressed over the pubes and deep into the pelvis, the presence or absence of the fundus over the cervix can be determined (Fig. 166). Two fingers in the rectum

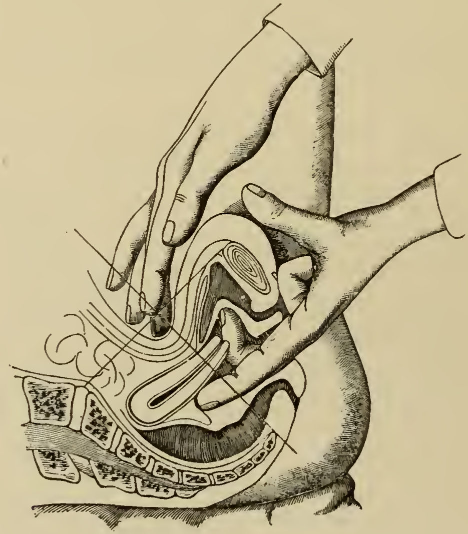


Fig. 166.—Bimanual Palpation of the Uterus from the Posterior Vaginal Wall.

can be made to approach the hand pressed down from above, and the entire pelvic cavity be explored, and the shape and position of the uterus determined.

In some cases it becomes necessary to introduce the uterine sound to ascertain where the cavity of the uterus is, and whether it is in the mass felt behind the uterus or above it. Gentle movements of the sound while a finger is in the vagina show whether the uterus is freely movable, and whether the mass behind the uterus moves with it. Sound. Gentle movements.

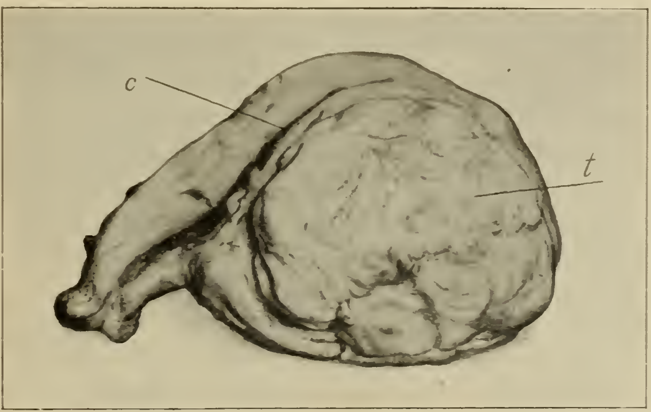


FIG. 167.—INTRAMURAL MYOMA OF POSTERIOR UTERINE WALL, SIMULATING RETROFLEXION. (*From photograph of author's case.*)
c. Cavity of uterus. *t.* Tumor.

7. **Prognosis.** Recent cases in which the pathological conditions can be removed are often cured. In long-standing cases the uterus can seldom be restored to its normal relations, but the fundus may be artificially fixed in front of the pelvic axis, or the cervix in the back part of the pelvis, by operative measures, and thus an imperfect kind of cure be effected. Puerile retroversion is seldom curable unless pregnancy takes place and develops the vagina sufficiently for the cervix to be held back of the axis of the superior strait. Recent cases. Long standing. Artificial fixation. Puerile.

Two indications

8. **Treatment.** Two things are to be accomplished by treatment: (1) to cure the pathological conditions upon which the displacement depends, and (2) to replace the uterus, and keep it in place.

Recent inflammation.

Recent inflammation in the pelvis should be treated by rest, saline laxatives, counterirritation over the iliac regions, hot vaginal douches, ichthyol and glycerin tampons, etc.

Dilations.
Intra-uterine treatment.
Curettage.

Old rigid flexions, with endometritis or subinvolution, should be treated by dilation of the cervix with sounds, and intra-uterine treatment, or by forcible dilation and curettage (see part VII, chap. VIII, par. 15 to 28).

Local and general.
Dilation and curettage.
Faradism
Applications.
Douches.
Enemas.
Massage.

Relaxation of the sacro-uterine ligaments or general pelvic connective tissue may be benefited by both local and general treatment. Forcible dilation and curetting may be required for endometritis. When the uterus is flabby, intra-uterine bipolar faradism and stimulating applications to the endometrium, such as strong carbolic acid and the solution of ferric chlorid, increase the tonicity of uterine fiber, and to a certain extent of the surrounding connective tissue, into which uterine muscular fibers extend. Cold vaginal or rectal douches, used for a few moments three or four times daily, and cold enemas are useful adjuvants. Pelvic massage after Thuré Brandt's method may be made to accomplish much.

Anesthesia.

Peritoneal adhesions not overcome by massage should be separated if practicable by aid of anesthesia.

Treatment.
Stretching.
Massage.
Packing.
Cicatrices.
Placental remains.

Inflammatory or cicatricial contractions must be overcome by the treatment of the inflammation, and stretching of such contracted tissues as can be stretched either by uterine massage or vaginal packing in the knee-chest posture. Cicatrices involving the vaginal wall must sometimes be cut. Placental remains or tumors should be removed if present.

In giving pelvic massage for retroversion the uterus is replaced and elevated the same as will be described (par. 11) for prolapse, the main difference being that the uterus is not raised so high in the pelvis, and is allowed to escape from the assistant's hands quite suddenly in order to stimulate the round ligaments to contract after being thus stretched.

Adhesions that are of recent origin, and are not connected with pus accumulations in the pelvis, can frequently be separated by the bimanual rectovaginal manipulation (Fig. 168) while the patient is anesthetized (Schultze). The parts are steadied by the hand on the abdomen, while the finger in the rectum seeks to force itself between the uterus or its appendages and the pelvic wall or uterine ligament to which they are attached. Adherent tissues must never be pulled apart for fear that laceration may occur. By pressing the fundus toward the symphysis all restricting bands or tissues are rendered tense, and serve as guides to further efforts.

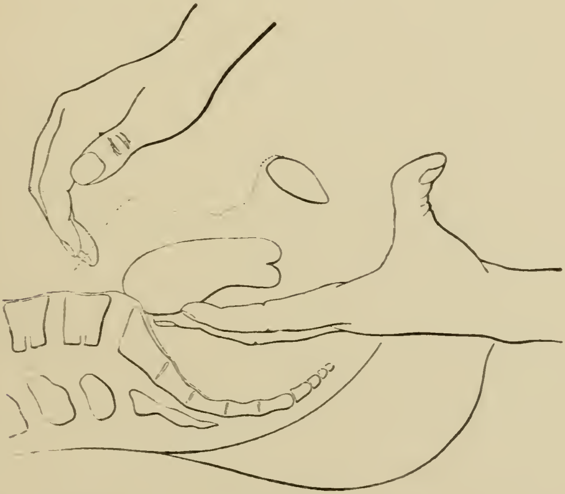


FIG. 168.—BIMANUAL REPOSITION OF RETROFLEXED UTERUS. (*B. S. Schultze.*)

When adhesions have been separated the patient should remain in bed for several days, and an ice-bag be kept on the abdomen for the first twenty-four or thirty-six hours.

9. The *general treatment* consists in cod-liver oil, cream, bacon, and other fatty foods for emaciated patients, iron for the anemic, and strychnia for those of relaxed fiber. Massage, particularly of the abdominal region, Swedish movements,

Food.

Tonics.

Massage, etc.

Electricity.

active out-of-door exercise, and electricity, both general and local, may be made to contribute to the end in view.

Preparatory.

10. Before *replacing the uterus* all acute inflammation and pelvic tenderness must be removed, and all adhesions separated. After that has been done, the symptoms often disappear and the correction of the malposition may not be necessary.

Three methods.

11. The uterus can be replaced by manipulation, by the sound or repositor, or by postural treatment.

Bimanual manipulation.

Pushing fundus up.

Pulling or pushing cervix back.

Catching fundus by abdominal hand.

Fingers in rectum.

Replacement by bimanual manipulation may be accomplished in the following manner. Two fingers are introduced into the vagina, with the forefinger in front of the cervix and the middle finger in the posterior fornix. The middle finger pushes up the fundus, and also *draws* the upper part of the cervix back in the pelvis by pushing back the posterior vaginal wall toward the sacrum, while the forefinger pushes the lower end of the cervix backward, thus prying the upper end of the uterus forward by using the attachment of the anterior vaginal wall as a fulcrum. When the fundus gets above the promontory of the sacrum, it is caught by the abdominal hand, pressed between it and the promontory, and brought forward over the bladder (Figs. 169 and 170). Also, by passing two fingers into the rectum the fundus may be pressed up toward the promontory (Fig. 168), and the replacement be aided by the thumb in the vagina pressing the cervix backward.

Manipulation of cervix with vulsella.

12. The uterus can also be replaced by means of a narrow-toothed vulsellum forceps, aided by digital manipulations (Küstner's method). The anterior lip of the cervix is grasped by the forceps and drawn to the vaginal entrance. This straightens the uterus and draws the fundus out of the hollow of the sacrum. By raising up the *handle* of the forceps, and then pushing the cervix back in the direction which the long axis assumed when the handle was raised, and then up toward

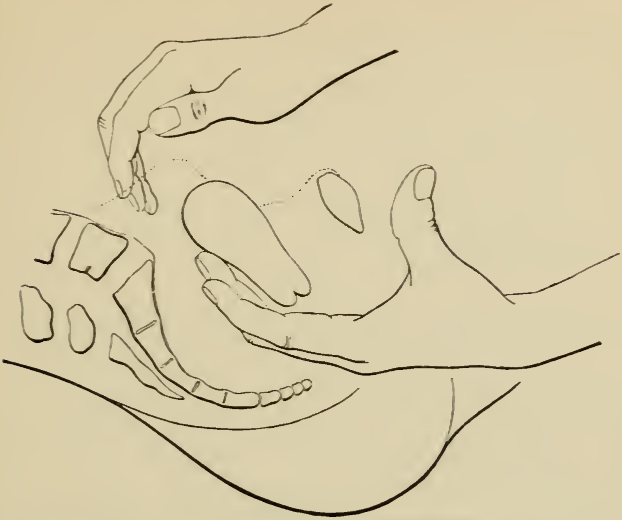


FIG. 169.—BIMANUAL REPOSITION OF THE RETROFLEXED UTERUS: THE EXTERNAL HAND TAKING CHARGE OF THE FUNDUS. (*B. S. Schultze.*)

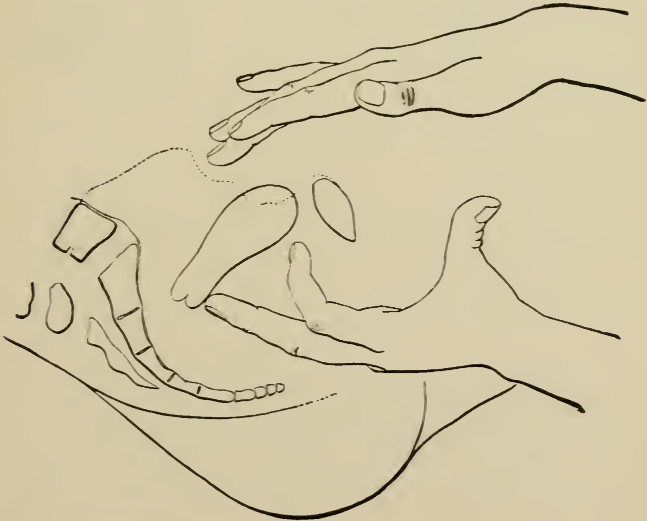


FIG. 170.—BIMANUAL REPOSITION OF THE RETROFLEXED UTERUS COMPLETED. (*B. S. Schultze.*)

the promontory, the fundus is pried forward and the uterus replaced. In some cases, particularly those in which the uterus is flabby, it is necessary to push up the fundus with the finger in the vagina or rectum before the backward sweep of the cervix can be made to act efficiently.

Push up fundus.

Great care.

13. Replacement with the sound requires great care to avoid injuring the endometrium or introducing sepsis, and is not generally employed.

The sound is introduced with the convexity backward, and then the handle made to sweep upward in a curve, until the convexity is turned forward and upward, without changing the position of the point of the sound or of the uterus. Then, by depressing the handle, the fundus is pried upward and forward with great gentleness. Decided resistance should cause us to abandon the effort. Antiseptic douches should be used before and after the attempt.

By dilating the cervix slightly and using a large urethral sound, injury to the endometrium is reduced to a minimum, and the fundus can be pushed forward with sufficient force to put the adhesions on the stretch. By directing an assistant to hold the sound the adhesions can be palpated bimanually, and their character recognized.

Knee-chest position.

Admit air.

Dislodge fundus.

Gravity.

Pregnant uterus.

14. The uterus may be replaced by putting the patient in the knee-chest position (Campbell), admitting air to the vagina, and pushing the fundus toward the promontory of the sacrum with a blunt instrument like a drumstick, or by maneuvers similar to those described in paragraph 11 for bimanual replacement. When the fundus is dislodged from the hollow of the sacrum, gravity completes the replacement. This is a good method for replacement of the pregnant uterus.

It should be remembered that the normal attachments of the uterus are mainly about the upper part of the cervix, and that the uterus is thus a double lever with a somewhat movable fulcrum at or near the internal os. To press the lower end of the cervix back, means to tip the fundus forward, and *vice versa*.

15. If the uterus has been suddenly and recently displaced,

Tampon. Pessary.

a vaginal tampon to hold the cervix back may suffice for a cure. In most cases a support or pessary made of hard rubber will be required.

Forms.

The most useful pessary is the Hodge lever pessary in one of its modified forms, the Albert Smith, Emmet, Thomas, or Fritsch.

Direct action on cervix.

Schultze's figure-of-eight and Fritsch's pessaries are good when the posterior vaginal fornix is relaxed and a more direct action upon the cervix is required.

Uterus replaced first. Examinations.

The uterus should be replaced before the pessary is introduced, and the patient examined immediately afterward, and then in a day or two again, to ascertain whether the fundus remains forward or not.

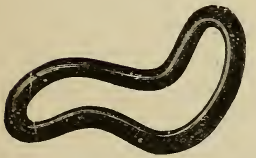


Fig. 171.—Albert Smith Pessary.

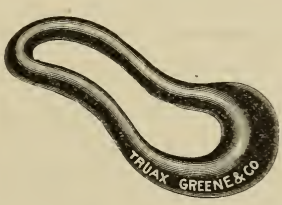


Fig. 172.—Thomas' Retroflexion Pessary.

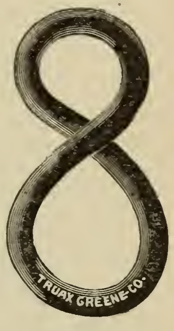


Fig. 173.—Schultze's Figure-of-Eight Pessary.

No discomfort.

A pessary must, however, not only hold the uterus in place, but should cause no discomfort.

Douches.

While a pessary is being worn, a copious vaginal douche should be used, if possible, once daily. If that be impracticable, an antiseptic douche (1 : 2000 corrosive mercuric chlorid or potassium permanganate) may be used two or three times a week.

Subsequent examinations.

The patient should be examined at least once in three months, and the pessary taken out, cleaned, and replaced every three or six months.

The easiest method of introduction of a pessary is over a sound that holds the uterus in place, the posterior arm being under the sound in order to pass behind the cervix.

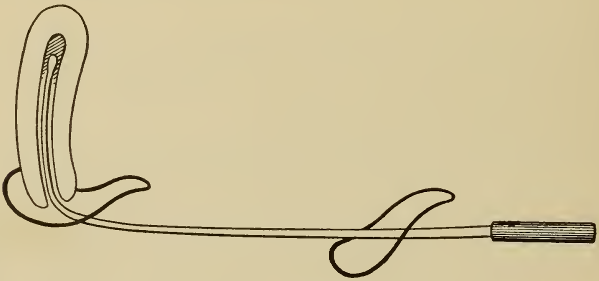


Fig. 174.—Introduction of Pessary over the Sound.

As the introduction of the sound is objectionable, it is preferable to replace the uterus and hold the fundus forward over the bladder by the hand on the abdomen (Fig. 170), while the forefinger of the other hand is hooked into the ring of the pessary from below over the posterior arm, and pushes it under and behind the cervix. If the posterior arm is not thus held down by the finger, it will slip up in front of the cervix and throw the uterus back into its old malposition. (Fig. 175.)

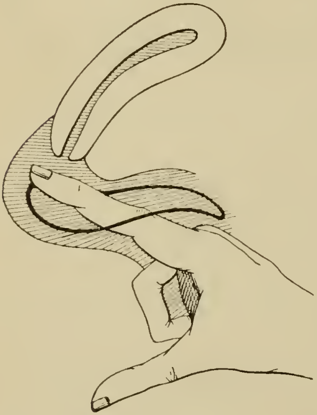


Fig. 175.—Pushing Posterior Arm of Pessary Behind the Cervix.

Another way is to replace the uterus by the postural method, and introduce the pessary in the genu-pectoral posture. It may also be introduced in the left-lateral posture by the aid of a Sims speculum, which holds the posterior vaginal wall out of the way (Skene).

As a rule, the more voluminous the vagina and the more relaxed the outlet, the greater must be the pelvic curve of the pessary in order to be retained. The pessary should be just large enough to hold the uterus in place, and to be kept entirely within the vagina during the action of abdominal pressure. When the posterior vaginal fornix is voluminous the thick posterior bar of Thomas' modification will sometimes fill the posterior fornix and suspend the cervix better than the other varieties.

In fitting a pessary in difficult cases, the soft-rubber flexible pessaries may be modeled to suit the case, and after having been thoroughly tried, can be copied in hard rubber, which does not become offensive as easily and is more durable.

Lacerated cervix.

16. Both for the purpose of rendering the pessary more efficient, and of giving firmness to the tissues that keep the cervix in place, lacerations of the cervix and perineum should be repaired, the vaginal outlet narrowed, and the pelvic floor raised for some distance inward, by carrying the denudations well up into the posterior sulci (part v, chap. II).

Perineum and vaginal entrance.

Operation to hold uterus.

17. When a pessary fails to permanently cure the displacement, or when the uterus is replaceable, but can not be held in place by a pessary, operations may be performed to accomplish the purpose.

Indications.

18. *Shortening the round ligaments*, or *Alexander's operation*, is the best one for cases dependent upon relaxation of tissue, and not connected with adhesions or contractions in the pelvis that might drag upon the body of the uterus after it had been replaced over the empty bladder. The fundus is held over the bladder, while the uterus assumes more nearly normal relations than after any other operation, and is held in place by abdominal pressure.

Effect.

Alexander's operation is one of the most difficult operations in gynecology to learn, and is liable to prove a failure unless performed for definite conditions. The steps are as follows: Incision three to five centimeters (one to two inches) long over the spine of the pubes and along the upper edge of Poupart's ligament. Division of the intercolumnar fascia and seizure of the tissues that lie against the external column and Poupart's ligament with forceps or blunt hook. Traction on tissues and snipping of fascial bands until ligament can be seen and felt to draw from the internal ring, or until it *runs*. Same procedure on the other side. Replacement of uterus with sound. Drawing out first ligament until it moves the sound in the uterus, and suturing with buried silkworm-gut or hardened catgut to the external inguinal ring, and also firmly into the wound by the external sutures. Same procedure on the other side. Introduction of pessary, to be left for three months. The patient remains in bed for three weeks.

H. P. Newman makes a small incision into the fascia over Poupart's ligament so as to enter the inguinal canal near the internal ring, and seizes the ligament where it is of good size and can be more easily recognized. Edebohls operates in this way and sews up the wound with tier sutures of catgut. (Transaction 2d Periodic Congress of Gynecology, etc., 1896.)

Uterine curettage, trachelorrhaphy, and perineorrhaphy may, if indicated, be performed at the same sitting, just before the Alexander's operation.

Instruments: Knife, small retractors, tissue forceps, small scissors, uterine sound, blunt hook, six hemostatic forceps, needle-holder, needles, silkworm-gut, pessary, etc.

Incision. Separation of bladder. Suturing. Sterile women. Parturition.

19. *Vaginal fixation of the uterus* (Duehrssen, Mackenrodt) consists in making a median or transverse incision in the anterior vaginal wall (anterior colpotomy), separating the bladder from the uterus and vagina, and stitching the anterior uterine wall to the incision in the anterior vaginal wall. It accomplishes the purpose in most cases, and may be done in connection with plastic operations upon sterile women. A subsequent parturition is apt to be seriously complicated by the abnormal fixation of the uterus.

Mackenrodt's method is about as follows: Median line incision in the anterior vaginal wall from the neck of the bladder to the cervix, meeting a short transverse incision just in front of the cervix. Separate the bladder from the vagina on either side of the incision with the fingers, and from the uterus as far as the peritoneal reflexion; draw the bladder away from the uterus so as to reflect the peritoneum still farther from the uterus if possible, and also from the bladder, catching the anterior uterine wall higher and higher with tenaculum forceps or provisional sutures. Stitch the fundus to the anterior vaginal wall behind the bladder by means of silkworm-gut sutures that also close the vaginal wound. Introduce pessary. The after-treatment is the same as after other plastic operations.

Duehrssen's method is somewhat different. Pull down the cervix, make a transverse vaginal incision in front of it, separate the bladder from the uterus, and incise the peritoneum transversely. Pull the fundus down into view with the vulsella, and pass one or two sutures through the vaginal walls, the peritoneal edge, and the fundus, and tie them. The cervix is now drawn forward, exposing the peritoneal edges, which are sewed together by transverse sutures, making a sagittal row of them. The vaginal wound is also closed by transverse sutures.

The round ligaments may also be shortened intraperitoneally through the T-shaped incision mentioned above in Mackenrodt's method. The round ligament is hooked down with the finger, grasped by forceps, drawn toward the vulva, and a suture of hardened catgut put through it as near the inguinal end as possible, and then into the uterine wall where the ligament is given off, and is tied. This forms a loop which can be bruised by the forceps, or scarified, to produce adhesions. The same is done on the other side. The operation is quite safe, for the peritoneal cavity is walled off laterally by the shortened ligaments. The bladder is stitched back to the vaginal incision by transverse sutures which close the vaginal wound, all but a small space in front of the cervix through which a little gauze is introduced and left for twenty-four hours.

As a preliminary step to the above, I usually draw down the peritoneum from over the bladder and behind the pubes and stitch it to the fundus by two catgut sutures. If an ovary has been removed, I suture the stump instead of the fundus (vaginal hysteropexy).

Instruments: Perineal retractor, sharp-pointed scissors, tenacula, tenaculum forceps, uterine sound, catheter, hemostatic forceps, needle-holder, sponge holders, needles, suture material, pessary, etc. Dorso-sacral posture.

Suture of fundus to anterior abdominal wall.

20. *Abdominal Suspension of the Uterus, or Hysteropexy.* When an abdominal incision has been made for the purpose of separating adhesions or the removal of the uterine appendages, the easiest and most certain way to hold the uterus forward is to sew the fundus to the anterior abdominal wall by means of two buried catgut sutures passed transversely through the upper portion of the anterior uterine wall and through the fasciæ at the lower edge of the abdominal wound.

If appendages removed.

If the appendages have been first removed, they may be sutured to the peritoneum and subperitoneal fasciæ on either side of the incision, and only one suture need be passed through the uterine wall. This method holds the uterus up firmly, but does not restore it to a position as natural as that following Alexander's operation.

When the abdomen is open the round ligaments may be shortened within the peritoneal cavity. W. Gill Wylie recommends scraping the inner surface of the ligament on either side, and folding the raw scraped surface together, uniting the parts by three fine silk sutures. A. P. Dudley folds the ligaments inward, so as to bring them together in front of the fundus, and stitches them, thus folded, to the anterior wall of the uterus. The results are not as good as those of Alexander's operation, or suspension. Mann sews together a double fold of ligament, and claims better results.

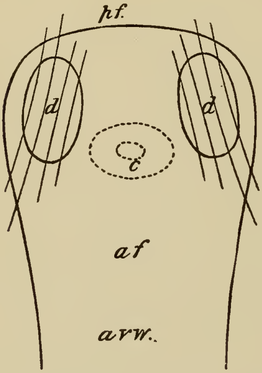


Fig. 176.—Oval Denudations in Lateral Posterior Vaginal Fornices for the Purpose of Drawing the Cervix Backward.

c. Cervix uteri, in section. *p.f.* Posterior vaginal fornix. *a.f.* Anterior vaginal fornix. *a v w.* Plane of anterior vaginal wall. *d, d.* Denudations, with sutures passed.

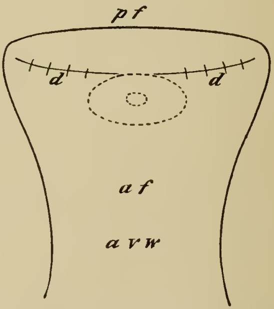


Fig. 177.—Same as Fig. 176. Sutures Tied.

A fold may sometimes be made in the sacro-uterine ligaments, either through an abdominal incision (Frommel) or a vaginal incision (Sänger), in such a manner as to shorten them and hold back the cervix. The results have, as a rule, been imperfect. The recto-uterine pouch is obliterated, but the fundus leans over it. Prior reports several cures by means of a transverse incision into the culdesac of Douglas and tamponade of the culdesac with iodoform gauze, so placed as to crowd the cervix upward and backward. The tampon is left in place for several days, and the contraction following its removal results in the obliteration of the culdesac and posterior fixation of the cervix.

In mild cases the cervix may be drawn back by means of oval denudations, one on each side of the cervix and extending backward, to be drawn together by sutures passed anteroposteriorly. (See Figs. 176 and

177.) The cervix has also been stitched to the denuded posterior vaginal fornix, its posterior surface having been first denuded.

Hochenegg has, in one case, separated the adherent retroverted uterus through a sacral incision. The fundus afterward lay over the obliterated culdesac of Douglas. The end hardly justifies such means.

CHAPTER V.

PROLAPSE OF THE UTERUS AND PELVIC ORGANS.

LAPSUS, ENTEROCELE.

1. **Mechanism.** The pelvic organs are surrounded by connective tissue, and all parts of them are supported by it. Into this connective tissue muscular fibers penetrate, rendering it not only stronger and exceedingly elastic, but giving it a quality by which it may develop or lose strength and elasticity according to circumstances.

Pelvic connective tissue.

Muscular fibers.

Elasticity.

When the strength and elasticity of this tissue as a whole is diminished beyond a certain limit, the vagina loses its firmness, and the cervix is not well sustained against abdominal pressure, and may be forced, under circumstances involving increased abdominal pressure, toward the flabby vaginal entrance. The fundus, as a rule, falls into the culdesac of Douglas, and the whole retroverted uterus is forced toward the vaginal outlet and becomes *prolapsed*. Or it may protrude at the vulva, covered by the inverted vagina and accompanied by a portion of the bladder, forming a *procidentia*. This is usually the mechanism in nulliparæ and sometimes in multiparæ, and is called *primary* prolapse and procidentia of the uterus.

Loss of strength, etc.

Cervix.

Fundus.

Protrudes, etc.

Primary prolapse and procidentia.

When the connective tissue about the pelvic outlet is relaxed, or in part destroyed by traumatism or disease, and the perineum is also relaxed, the lower end of the anterior or posterior vaginal wall, or of both, press down to fill the outlet, forming

Pelvic outlet relaxed, etc.

Vaginal walls.

Base of bladder and urethra.
Rectum.

anterior and *posterior colpocele.* When the tissues at the neck and base of the bladder are relaxed or injured, the urethra, or both the urethra and bladder, covered by the stretched vaginal wall, are forced into the yielding vulva, or even beyond it, producing *urethrocele* or *cystocele.* When the tissues about the lower curve of the rectum and perineum are similarly incapacitated, the rectovaginal septum protrudes with the posterior vaginal wall, producing *rectocele.*

Drag upon cervix.
Retroversion.
Through vulva.
Secondary.
Two kinds.

When the tissues about the uterus are lacking in firmness, and the organs at the vaginal entrance are prolapsed, the cervix is dragged forward by them while the abdominal pressure forces the uterus into retroversion, or down to or through the vulva in the curve of the pelvic axis. This is called secondary prolapse or procidentia, respectively, of the uterus. Thus we have two kinds of prolapse,—one in which the uterus precedes the vaginal walls, and another in which the uterus follows them.

Vagina, etc., prolapsed.
Uterus held.
Cervix relaxes.
To or through vulva.
But little increase.

When the vagina and rectum are prolapsed, but the uterus is kept well back in the pelvis, the traction on the cervix may cause the latter to relax and become more or less infiltrated with connective tissue, and stretch down toward or through the vulva, producing *prolapse* or *protrusion of the cervix.* This is also called hypertrophy of the cervix, although there is usually but little increase of cervical tissue.

Tissues weakened.
Uterus enlarged.
Vaginal entrance firm.

When the tissues about the uterus are moderately but symmetrically weakened, or the weight of the normally shaped uterus is increased while the parts about the vaginal entrance are firm, the uterus sinks down in the axis of the superior strait, and the cervix approaches the coccyx, forming *lapsus.*

Bladder separated from cervix.
Culdesac distended.

When the bladder is separated from the cervix (a rare occurrence), the intestines are forced down against the relaxed anterior vaginal fornix, producing *anterior enterocele.* When the culdesac of Douglas is distended, the intestines may be forced down beyond the cervix, and be held in a pouch formed by the posterior vaginal wall, producing *posterior enterocele.*

2. **Pathology.** Procidentia uteri, or protrusion of the uterus, involves a more or less complete inversion of the vagina. The inverted vaginal walls become rough and hard, and occasionally are somewhat like the surface of the skin. Ulceration from friction against the thighs and clothing may take place. The cervix, which, on account of relaxation and descent of the vaginal attachment, as well as more or less ectropion due to the resistance of the inverted vagina to further prolapse, often looks more like a depression in the mass than a projection from it, is apt to be ulcerated or eroded. The cervix is usually elongated, but contracts and becomes shorter when the uterus is replaced. Metritis and subinvolution are common. The bladder is partly without and partly within the pelvis, the urethra passing downward into the

Vaginal walls.
Friction.
Cervix.
Ectropion.
Depression.
Erosion.
Contraction.
Replacement.
Metritis, etc.
Bladder and urethra.

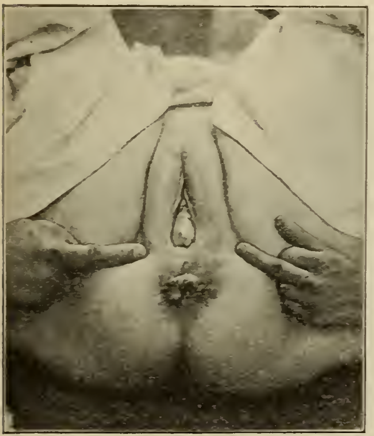


FIG. 178.—CYSTOCELE. (*Photograph of Author's Case.*)

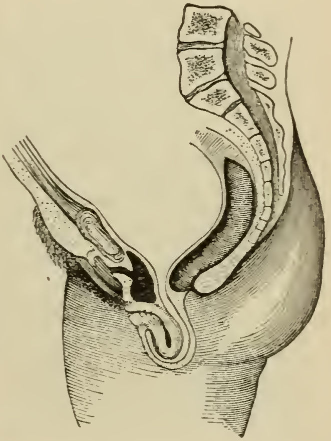


FIG. 179.—COMPLETE PROCIDENTIA UTERI, WITH THE USUAL RETROFLEXION. (*Schroeder.*)

Inflammations. Rectum. Peritoneum. Broad ligaments, etc.

protruding portion. Urethritis and cystitis, due to retention of the urine in the pouch formed by the curved urethra or by the prolapsed portion of the bladder, and also hydronephrosis and nephritis, due to obstruction of the displaced ureter or to ascending inflammation, are occasionally met with. The rectum is seldom extensively prolapsed. The peritoneum comes down to or beyond the vulva with the posterior surface of the uterus. The broad ligaments, with the uterine adnexa, are drawn down into the peritoneal funnel formed by the procidentia, and are in a state of extreme tension, which interferes with the return circulation. A passive engorgement of all the prolapsed tissues is the rule.

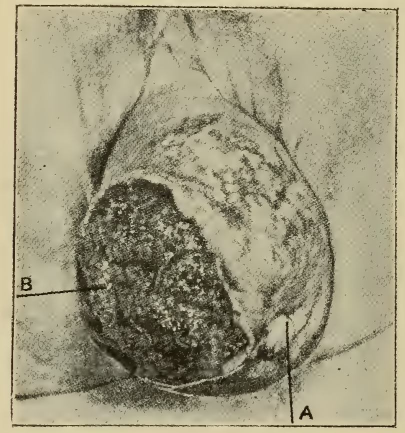


Fig. 180.—Same Malposition as Fig. 179, Showing also the Ulceration of the Vagina.
A. Os uteri. *B.* Ulcerated surface.

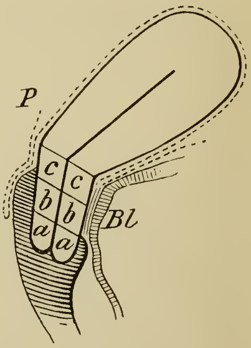


Fig. 181. — Division of the Cervix into the Vaginal, Intermediate, and Supravaginal Portions. (*Schroeder.*)
a. Vaginal portion. *b.* Intermediate portion. *c.* Supravaginal portion. P. Peritoneal cavity. Bl. Bladder.

Passive engorgement.

Common. Special variety. Fundus. Cervix. Elongation. Three portions.

3. Prolapse of the parts, due to elongation and hypertrophy of the cervix, is one of the most common forms, and constitutes a special variety. In such cases the fundus may be at the normal elevation, or only slightly depressed, while the cervix reaches or protrudes at the vulva (Hugier). The elongation and hypertrophy may be of the vaginal portion, or

of that portion which is supravaginal in front and vaginal behind, or (seldom) of that portion which is entirely supravaginal. (Fig. 181.)

Vaginal portion.

When the vaginal portion alone is elongated, there may be no perceptible prolapse of the vagina. (Fig. 182.)

Intermediate.

Peritoneum.

When the intermediate portion is elongated, the anterior vaginal wall and bladder are prolapsed, but the posterior vaginal wall is not. (Fig. 183). The peritoneum is remote from the vulva in all cases of hypertrophy of the intermediate and lower portions of the cervix. When the supravaginal portion is elongated, both the anterior and posterior vaginal walls are prolapsed, and the peritoneum descends toward the vulva.

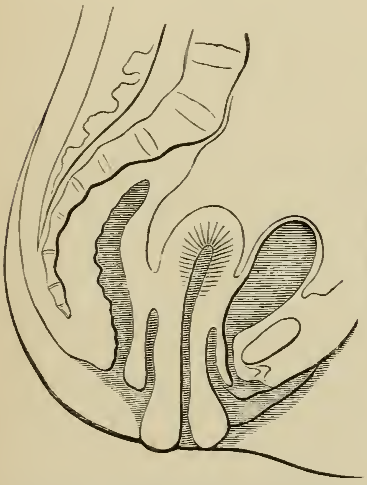


FIG. 182. — PROTRUSION OF THE CERVIX WITH ELONGATION OF THE VAGINAL PORTION. (*After Graily Hewitt.*)

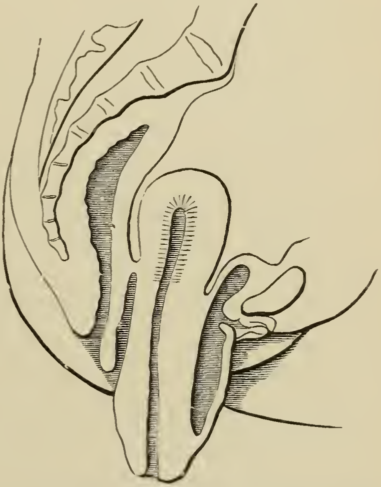


FIG. 183. — PROTRUSION OF CERVIX WITH ELONGATION OF THE INTERMEDIATE PORTION. (*After Graily Hewitt.*)

Congenital prolapse has been recorded in seven cases, appearing in from one to seven days after birth, and in one case appearing as late as the tenth day. The condition was, in all of them, connected with lumbosacral spinal bifida, of which it may be considered an occasional symptom. More or less rectal ectropion, general relaxation of the pelvic tissues, and enlargement of the cervix were in most cases observed. Club-foot was present in four, hydrocephalus in two, absence of the patella in two, etc. The infants all died between the tenth day and the fourth week. "Probably the chief causal factors are the results of disturbance of the innervation of the parts in consequence of the myelomeningocele; but other etiological circumstances doubtless exist, such as increased abdominal pressure, the abnormally large size of the pelvic canal, and enlargement of the uterine cervix or body, or both." (Ballentyne and Thompson.)

Relaxation. 4. **Etiology.** The causes of prolapse are such as lead to relaxation of the pelvic tissues. Virgins least liable, etc. Virgins are the least subject to it, child-bearing women of the working classes the most. Lapsus and retroversion. Lapsus and retroversion of the uterus predispose to prolapse, but, on account of a firmness or rigidity of some of the supporting tissues, do not usually terminate in it.

Nulliparæ. In nulliparæ an overdistended bladder, obstinate constipation, dysentery, whooping-cough, pelvic tumors, weakening of the tissues by cachectic conditions, old age, etc., Relaxation. produce relaxation, while the sudden or abnormal action of Sudden action, etc. abdominal pressure, as in coughing or straining, particularly while the bladder is full, may bring on prolapse of one or more of the pelvic organs.

Parous women. In child-bearing women the injury attending, or relaxation Abnormal labors. following, abnormal labors, together with the subsequent Laborious exercise. abdominal pressure that goes with laborious exercise, are responsible in the majority of cases.

Sudden onset. 5. **Symptoms.** When the prolapse comes on suddenly, a feeling of faintness, with pain in the lower abdomen, is experienced, followed by nervous disturbances or even prostration.

Gradual pelvic symptoms. Local irritation. Urinary. Rectal. Discharges.

In the cases which develop gradually, there may exceptionally be no symptoms. Ordinarily backache, bearing-down and dragging sensations about the vulva, and a disagreeable feeling of weakness, or want of support, are noticeable. Local irritation and ulceration of the protruding mass may give rise to great discomfort (Fig. 180). Difficulty in urinating, and even the symptoms of urethritis and cystitis, are prominent in cases of urethrocele, cystocele, and in some cases of procidentia. Rectocele is apt to interfere with the expulsion of the contents of the rectum. Leukorrhea is common. Menstruation may be either profuse or scanty.

General system.

Nervous symptoms and gastro-intestinal derangements, such as have been described among the symptoms of endometritis, are occasionally experienced.

Protrusion. Catheter.

6. **Diagnosis.** *Urethrocele* is known by a sagging or protrusion of a small sensitive mass under the pubic arch. The catheter or sound enters into it as into a pouch, and may then be turned up so as to pass through the undilated neck of the bladder.

Visible folds.

Anterior and posterior *colpocele* form one or two more or less rugated vaginal folds, visible through the relaxed vulva.

Soft tumor, etc. Smooth catheter. Finger in rectum.

Cystocele produces a soft tumor-like body, which, when the patient is asked to bear down, increases in size and pushes out through the vulva. (Fig. 178.) The anterior vaginal wall is smoothly stretched over it. The catheter passes into it, instead of over it as in anterior colpocele. *Rectocele* is distinguished from posterior colpocele by passing the finger through the anus into the prolapsed tissues.

Fornices. Fornices deep. Anterior fornix obliterated.

7. When the *cervix is elongated*, the extent of the vaginal displacement, as felt by passing the finger into the anterior and posterior vaginal fornices, informs us which portion is affected (Fig. 181). Thus, if the fornices remain deep while the cervix is at the vulva, there is an elongation of the vaginal or lower portion of the cervix (Fig. 182). If the anterior fornix is

Sound. Fundus. Both fornices obliterated. Fundus. Sound.

entirely obliterated, and the posterior is normal in depth, the intermediate portion of the cervix must be elongated (Fig. 183). The uterine sound in either of these cases passes to a depth greater than three inches, or eight cm. Bimanual rectal palpation reveals the fundus almost normally high in the pelvis. If both fornices are obliterated, and the bimanual rectal examination finds the fundus high up, and tapering down to a long, narrow cervix, the supravaginal portion is elongated. The sound will enter much deeper than normal.

Fundus low. Pushed back.

8. When the *whole uterus is prolapsed* the fundus may be felt low down in the pelvis by the finger introduced into the rectum. The uterus can be pushed back to a normal position and palpated bimanually, and thus its size and shape determined.

Vaginal walls. Posterior wall. Everted os. Relation of bladder and rectum. Bimanual rectal.

If there is *procidentia*, the vaginal walls are turned out when the patient strains or stands up. Sometimes the posterior vaginal wall is not entirely prolapsed, and the finger passes in a short distance over the perineum. The everted os is apt to be seen and felt as an eroded funnel-shaped depression into which the sound passes. The catheter introduced into the bladder and the finger into the rectum reveal the relative location of these viscera. The bimanual rectal examination demonstrates the absence of the uterus from the pelvis.

Palpating ureters. Intestinal gurgling. Size and resonance of soft tumor. Finger in rectum.

9. *Anterior enterocele* may be discovered by pushing the cervix back into place and palpating the ureters and interureteric ligament bimanually. These tissues will be further removed than normal from the cervix, and the intestinal gurgling can be felt behind them and in front of the cervix. *Posterior enterocele* is recognized by the large size and resonant percussion note of the soft, tumor-like mass covered by the posterior vaginal wall. The finger introduced into the rectum ascertains that it is not a rectocele.

10. **Treatment.** The displacements under consideration may be treated by pessaries, massage, or by operations. Pessaries are of palliative value only, but may be employed preparatory to operations, or when operations are inadmissible.

Methods.

Pessaries.

The patient may learn to keep the parts in place by packing the vagina, or having a friend pack it, every twenty-four or forty-eight hours, with wool or strips of borated gauze, introduced in the knee-chest posture. When this fails, an inflatable or an elastic rubber ring (Peaslee, Mayer, Dumont-Pallier) may answer. Cystocele and anterior enterocele may be corrected by Schultze's sleigh pessary, or a large well-curved Hodge, or Gehrung's anteversion pessary. Braun's colpeurynter, or a thin, inflatable rubber bag, is often efficient, and can be introduced and removed daily by the patient. Various forms of pessaries with external support have been found useful, but they are troublesome, may exert injurious pressure, and do not always hold the uterus in a good position.

Packing vagina.

Inflatable ring.

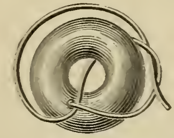


FIG. 184.—INFLATABLE RUBBER RING.

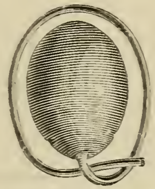


FIG. 185.—INFLATABLE RUBBER BAG.

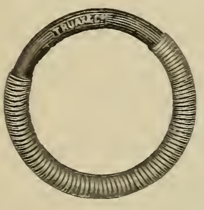


FIG. 186.—ELASTIC RING PESSARY.

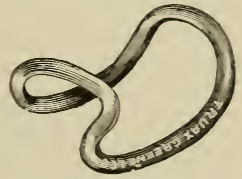


FIG. 187.—SCHULTZE'S SLEIGH PESSARY.

Cystocele, etc.

Forms of pessaries.

External support.

In cases of elongation of the cervix with but little displace-

Elongation of cervix.

ment of the fundus, a well-adjusted pessary helps to reduce the enlargement.

Injurious pressure.

The danger of injurious pressure, resulting in ulceration or perforation of the vagina or rectum, should always be kept in mind.

Uterine massage. Retroversion. Daily. Replacement. Local massage. Exercise of pelvic muscles.

11. Thuré Brandt's method of uterine massage has in his hands cured 70 to 80 per cent. of cases in from two to six weeks. Frequently a moderate retroversion is substituted for the prolapse, and sometimes the prolapse returns. The treatment should be given daily. It consists (1) in replacing the uterus and then raising it as high up above the pelvis as possible, (2) in massaging the uterus and ligaments bimanually, and (3) in artificial exercise of the pelvic muscles.

The patient, with no clothing on but a loose, thin garment, lies on a couch with shoulders slightly elevated and knees drawn up. The surgeon sits at her left side, passes the left index finger into the vagina, with the other fingers extended between the buttocks, places the uterus in anteversion, and holds the cervix back and high up in the pelvis (Fig. 188). The assistant's hand is then pressed down behind the pubes until it feels that of the operator. Then both hands push the uterus toward the promontory of the sacrum, and as high over it as possible. The uterus is then slowly and gently let down into anteversion and elevated twice more, preferably with an interval of ten minutes between each.

After each elevation the uterus is supported by the vaginal finger, and massaged by the abdominal hand with circular friction motions, commencing at the fundus and working down toward the cervix. Then the sacro-uterine and broad ligaments are compressed bimanually and similarly massaged. The operator begins very gently, gradually becoming more vigorous, and again becomes more gentle in finishing.

Finally the operator forcibly separates the patient's limbs while she resists and tries to close them, at the same time that she holds her hips up from the couch, and thus contracts and develops the perineal and pelvic-floor muscles.

Afterward the patient assumes the left-lateral posture for a short time.

These maneuvers should be repeated daily for five or six weeks, and the patient avoid going up steps or engaging in other tiresome exercise for the first week or two, when she may gradually resume her ordinary duties.

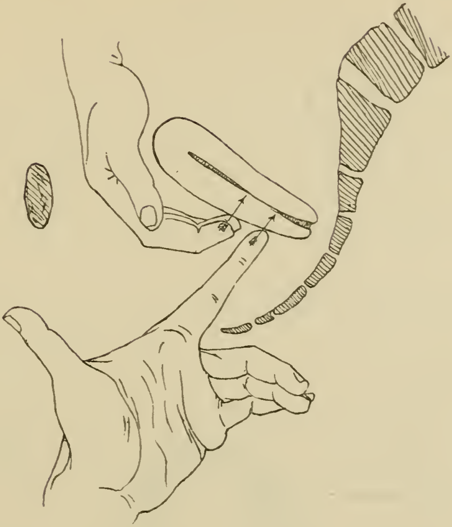


FIG. 188.—COMBINED ACTION OF THE HANDS OF THE OPERATOR AND ASSISTANT IN ELEVATING THE UTERUS. (*After Thuré Brandt.*)

a. Assistant's hand. *b.* Operator's hand. Both are pressing in the direction of the arrows.

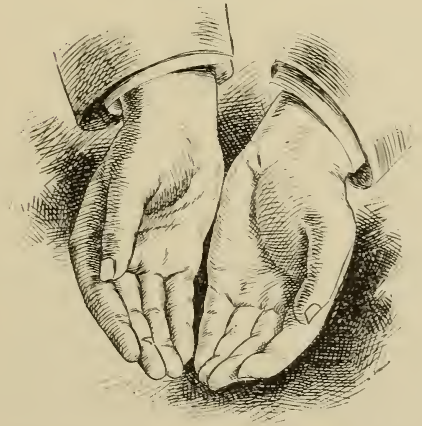


FIG. 189.—POSITION OF THE HANDS OVER THE PUBES, *b* of Fig. 188. (*After Thuré Brandt.*)

The patient should also strengthen the pelvic muscles by lying flat on the back three or four times daily, crossing the feet, and contracting the perineal muscles several times as forcibly as possible, as if attempting to restrain the passage of liquid fecus.

Prolapse of the rectum is treated as follows: (1) Reduce the prolapse. (2) Begin and finish each daily seance by tapping the sacrum and such Swedish movements as force the blood through the pelvic viscera (part 1, chap. v, par. 11). (3) Insinuate the fingers into the pelvis near the left anterior superior spine of the ilium, with vibratory motions until the sigmoid flexure is reached, then push it up toward the umbilicus until the anus is seen to be drawn up by it. (4) Massage the rectum through the posterior vaginal wall and fornix. (5) Intermittent finger pressure on the tissues all around the anus to stimulate the sphincter. (6) The patient stands facing and leaning with the hands against a wall and contracts the sphincter ani as in holding back a stool, and repeats the exercise four or five times daily. (7) A small nutrient enema immediately after each passage of the bowels to act as a local stimulant. (8) Separate the patient's knees a few times while she resists. (9) Regulate the bowels.

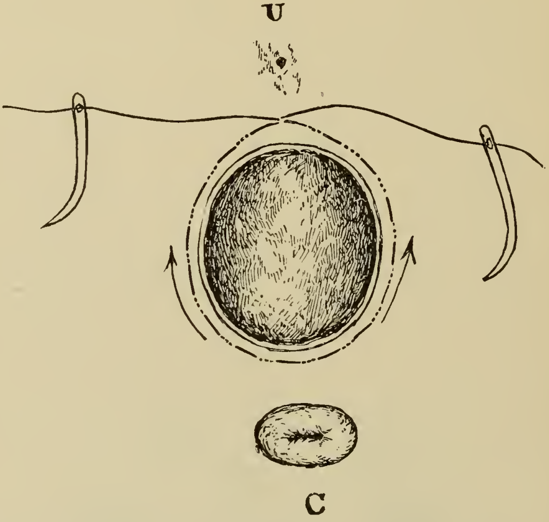


Fig. 190.—Stoltz's Denudation for Urethrocele and Anterior Colpocele. (*Mundé.*)
U. Urethra. C. Cervix.

Stoltz operation.
Denudation
Suture.
Purse-string
Removal.

12. *Urethrocele* and *anterior colpocele* may be remedied by Stoltz's operation. This consists in removing a circular piece of vaginal membrane, from three to five cm., or from one to two inches, in diameter, just behind the meatus urinarius. The edges of the wound are brought together by passing a silk thread of medium size in and out of the vaginal membrane all around the raw surface, like a purse-string, and drawing the ends tight and tying them. The thread may be removed in two weeks. (Fig. 190.)

The instruments required are a sharp knife or a sharp-pointed pair of scissors, tissue forceps, a needle on a handle, a few hemostatic forceps, tenaculum, sponge-holders, perineal and vaginal retractors or Sims' speculum.

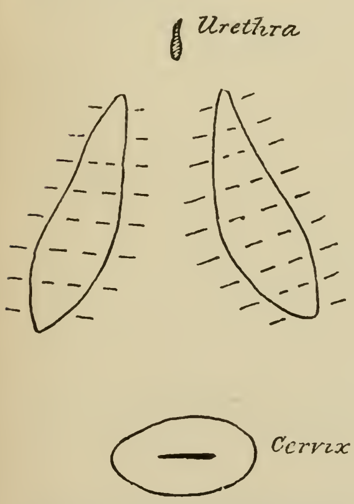


FIG. 191.—LATERAL DENUDATIONS IN THE ANTERIOR VAGINAL SULCI FOR CYSTOCELE.

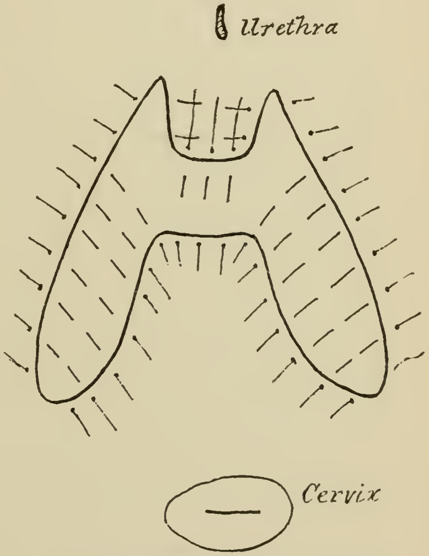


FIG. 192.—SAME AS FIG. 191, JOINED BY TRANSVERSE DENUDATION.

Denudation.
Sutures.

13. *Cystocele* may be cured by making an oval denudation along the anterior vaginal wall, beginning one or two cm., or ½ to ⅔ of an inch, behind the meatus, and extending back almost to the cervix, and closing it by transverse sutures.

Lateral denudations. Lateral denudations extending along the anterior vagina. sulci almost to the cervix draw together the connective tissue on either side, and are sometimes preferable. They may be Transverse. joined by a transverse denudation under the neck of the bladder if the vagina is stretched longitudinally. The raw surfaces Extent. should in bad cases extend back as far as the cervix. (Figs. 191 and 192.)

Same instruments as in Stoltz's operation, preceding paragraph, plus small needles and needle-holder.

Emmet's perineorrhaphy. 14. *Rectocele* alone is best treated by Emmet's perineorrhaphy (part v, chap. II). Extensive prolapse of the posteLateral denudation. rior vaginal wall requires that the lateral denudations be carried further along the posterior vaginal sulci (A. Martin), constituting posterior colporrhaphy or elytrorrhaphy. When the uterus is not retroverted, and the cystocele and rectocele have preceded the uterine prolapse in point of time, the plastic operations will often be sufficient to cure it. Sometimes a long lateral strip removed from each posterior vaginal sulcus, and a Tait's flap-splitting perineorrhaphy externally, not connected with these strips, constitute a good method.

Hegar's operation consists in denuding a large triangle extending from the vulva high up along the posterior vaginal wall. The posterior vaginal wall is thus elevated for a considerable distance, and forms a barrier to keep the cervix back.

In cases of procidentia, Le Fort and Neugebauer denude a space on the anterior and posterior vaginal walls opposite each other and stitch them together. It is a makeshift method, but sometimes a useful one in old people.

H. W. Freund's modification of G. Bellini's method consists in passing a silver suture around the circumference of the vagina just in front of the cervix, introduced in and out of the same points in the membrane, until it emerges at the point of entrance and forms a sort of buried purse-string. It is drawn tight, twisted, and cut short. An inch (two or three cm.), or a little less, further down another one is introduced and treated in the same way, and so on until the vaginal entrance is reached. The sutures are to remain permanently. Silkworm-gut may also be used. An anesthetic is not always necessary.

15. *Anterior enterocele* may be cured by vaginal fixation of the uterus (chap. IV, par. 19) combined with removal of the redundancy of the anterior vaginal wall. *Posterior enterocele*, when it forms a large tumor, requires the removal of an oval piece of vaginal wall from the posterior fornix, excision of the peritoneal lining of the enlarged culdesac of Douglas, and closure of the wound by deep sutures.

Vaginal fixation.

Denudation.

Excision.

Sutures.

16. In many cases involving the uterus a curetting and an amputation of the cervix are indicated for abnormal conditions of the endometrium or cervix, in addition to one or more of those already mentioned for prolapse of such other parts as may be displaced. Sometimes Emmet's trachelorrhaphy or Schroeder's amputation of the mucous membrane suffice, but as a rule Marckwald's modification of Simon's method is preferable (Fig. 193). The cervix is split on either side to the vaginal junction, transverse wedge-shaped portions are taken from each lip, and the vaginal membrane stitched to the cervical mucous membrane before sewing up the remains of the lateral incisions. The instruments used are the same as those in other plastic operations upon the cervix.

Curettage and amputation, etc.

Trachelorrhaphy.
Schroeder's.

Simon's.

Steps.

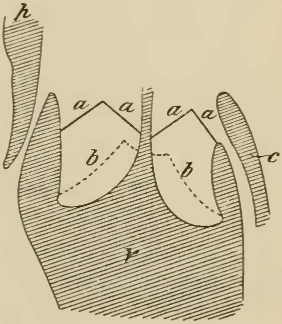


Fig. 193.—Median Section of Cervix, showing methods of Amputation.

Heavy lines, *a*, show the shape of incisions in Simon's method; the dotted lines, *b*, show the incision in Schroeder's method. *v*. Vagina. *c*. Bladder. *p*. Peritoneal cavity. (See Figs. 147 and 148.)

Curetting and amputation of the cervix or a trachelorrhaphy are all that is usually necessary for lapsus, except such treatment as is indicated for pathological conditions of the uterus.

Lapsus.

If the uterus, after being pushed back in the pelvis, assumes a retroverted position, such operations as have been recommended for retroversion are indicated.

Retroversion.

17. When the cervix is merely elongated and slender, it

Elongation.

need not, as a rule, be amputated, since replacement allows it to contract. When, however, there is also a thickening of the walls, the cervix should be amputated by the method called *enucleation of the cervix.*

Thickening.

A circular incision is made about one cm. (⅓ of an inch) from the margin of the cervix. Then the connective tissue is scraped from the anterior wall of the cervix for a short distance by the thumb or knife-handle, in such a manner that some fibers of the cervix are scraped off, but not enough to constitute a layer. By this maneuver the blood-vessels that may chance to lie between the bladder and cervix are avoided. In the same way the connective tissue is separated a short distance on the posterior wall. Then the broad ligaments are separated laterally in such a manner that a few fibers, or an almost imperceptible layer, of cervical tissue is left attached to the ligament, and thus the uterine arteries are avoided. In order to do this the scissors not merely cut close to the cervix, but cut slightly into its lateral edge, and the thumb nail strips up the few fibers thus incised. When the thumb nail can no longer separate the superficial cervical fibers, another snip or two of the scissors enables it to again strip up a few of them. Thus sufficient cervical fibers are peeled off to keep clear of large vessels laterally and to avoid tearing into the peritoneal cavity posteriorly. A portion or all of the cervix or uterus can be removed in this way.

Incision. Anterior wall scraped. Blood-vessels. Posterior wall. Broad ligaments. Uterine arteries. Technic.

When the enucleation has proceeded high enough, the cervix is cut off, and the mucous membrane in the median line, anteriorly and posteriorly, stitched over the end of the cervix to the cervical mucous membrane, with two or three silkworm-gut sutures. The vaginal raw surfaces are then enlarged by removing a strip two cm., or ⅔ of an inch, wide on either side, extending from the raw edges straight out along the lateral vaginal wall for five cm., or two inches. Each side as soon as denuded is sewed up with a few deep

Amputated. Mucous membrane. Sutures. Vaginal denudation. Sutures.

silkworm-gut sutures that gather up the loose connective tissue, and by numerous superficial catgut sutures.

By this method, which is a modification of Kaltenbach's, the ureters, peritoneum, and blood-vessels are in no danger of being wounded, and no buried ligatures or sutures are left. The few fibers from the cervical wall that are left in the connective tissue are scarcely perceptible, and give a safe hold for the sutures in gathering up the connective tissue. Temporary forcipressure in exceptional cases is required for a few small vessels.

Instruments: Vaginal retractors, vulsella to hold the cervix, knife, scissors, tenacula, hemostatic forceps, uterine sound, needle-holder, cervix needles, silkworm-gut, medium-sized catgut, sponges, gauze, etc.

Hegar's modification of Sims' method consists in circular amputation, and stitching the edges of the vaginal to those of the cervical mucous membrane in the middle, and to each other laterally.

Inefficiency of plastic operations.

18. *Procidentia* can seldom be cured by plastic operations upon the lower uterine supports, for the uterus is apt to remain with its long axis in that of the vagina, ready to act as a wedge and be forced out by abdominal pressure. Hence an operation must still be performed that will antevert the uterus.

Alexander's operation.

Ligaments drawn tight.

Shortening the round ligaments, or Alexander's operation (chap. IV, par. 18), is efficient provided the vaginal operations have been well performed. The ligaments must be drawn quite tight in order that abdominal pressure will act on the posterior surface of the uterus, and thus help to hold the fundus forward.

Adhesions.

Suspension.

When there are pelvic adhesions or other contraindications to Alexander's operation, or if the abdomen is to be opened for other purposes, the uterus or broad ligaments should be stitched to the abdominal walls (chap. IV, par. 20), as recommended for retroversion.

Vaginal fixation of the uterus has been performed to maintain anteflexion, and is appropriate in connection with an oval denudation upon the anterior vaginal wall (chap. IV, par. 19).

It is sometimes possible to hold back the cervix by making a fold or reef in the sacro-uterine ligaments through a vaginal incision in the culdesac of Douglas, or from the abdomen if it has been opened from above. The Trendelenburg posture renders the latter procedure practicable.

Hysterectomy.

19. In some cases of patients at or after the menopause, in which a high amputation is necessary, it is simpler and safer to remove the whole uterus than to amputate the cervix and perform plastic operations, and then one of the operations for suspension or fixation of the uterus. The vaginal bloodless method (Pratt) is preferable, and may be combined with plastic operations upon the vagina.

Bloodless method.

The first steps of bloodless vaginal hysterectomy are the same as for enucleation of the cervix described in par. 17. The snipping and scraping off of superficial uterine fibers is carried to the fundus, and the Fallopian tubes cut off just as they enter the uterine walls. The enucleation before and behind can be dispensed with by breaking into the peritoneal cavity where the peritoneum is reflected from the uterus to the bladder and culdesac of Douglas.

The peritoneal edges, and edges of the broad ligament, are then grasped by forceps and brought down into the vaginal wound and, after the pelvic peritoneal cavity is sponged out, are united to the vaginal edges with strong catgut. The strips of vaginal wall extending laterally from the wound (par. 17) are removed, and the whole wound sewed up.

The instruments are the same as for enucleation of the cervix.

Operations upon the vaginal entrance may then be done according to the instructions already given (part V, chap. II). Many times a Tait's perineorrhaphy will suffice.

CHAPTER VI.

INVERSION OF THE UTERUS.

Definition.

1. Inversion, or a turning inside out of the uterus, may be merely a folding in of the fundus, or a projection of the fundus through the dilated cervix, or a complete inversion of both the uterus and cervix.

The gynecologist practically meets with but two forms, that in which the fundus projects through the cervix, and the same with prolapse.

Gynecological forms.

2. **Etiology and Mechanism.** The *predisposing* causes are an enlarged uterus and a relaxation, or inability to contract, of a portion of the uterine walls, such as exists at the placental site in labor, and at the place of origin of a sessile intra-uterine fibromyoma. The *exciting* causes are pressure at or near the affected part, such as injudicious kneading of the flabby uterus with the fingers during the third stage of labor, or a traction upon it from below, as occurs when the adherent placenta, or intra-uterine fibroma, is drawn upon. A short umbilical cord, labor in the standing position, and adhesion of the placenta to the fundus, are liable to be followed by the accident. When the upper part of the uterus is thus inverted the uninverted part contracts upon it and prevents its replacement.

Enlarged uterus. Localized relaxation, etc.

Pressure.

Traction.

Favoring conditions.

Permanence.

3. **Pathology.** Leaving out of consideration cases that are observed immediately after labor, we meet with three conditions, viz.: (1) Inversion during involution, (2) Inversion after involution, and (3) Inversion with prolapse.

Conditions.

When *involution has not taken place* or is not complete, the peritoneal cup or funnel formed by the depressed fundus contains all or a large portion of the uterine appendages, and may also contain loops of intestines. The inverted uterine body projects into the vagina as a large, soft, more or less spongy mass, upon which can be discovered small depressions corresponding to the origin of the Fallopian tubes. The mucous membrane is bathed in mucus which is sometimes bloody, and presents the appearance of glandular endometritis. The rim of the cervix can always be felt around the upper constricted part of the tumor, the anterior lip often being less extensively inverted and hence longer than the posterior.

Contents of peritoneal funnel.

Inverted body.

Mucous membrane.

Cervix.

Anterior lip.

Inversion after involution has neither intestines nor uterine

Peritoneal cup. appendages in the peritoneal cup, excepting the ends of the Fallopian tubes and the round and ovarian ligaments. The Corpus. inverted corpus is firm, pear-shaped, and hangs out of the cervix like a fibroid polypus. Mucous membrane. The mucous membrane undergoes atrophy, particularly over the fundus, and the surface resembles granulation tissue. Glands. Sometimes the glands extend more deeply than normal into the muscular tissue underneath the area of superficial atrophy. Gangrene. Gangrene of the uterus due to cervical constriction has been known to take place.

Same, but protrudes. *Inversion with prolapse* is a rare condition, and is the same as inversion without prolapse, except that the uterus protrudes from the vulva. Mucous membrane. The mucous membrane becomes after a time covered with squamous epithelium, and may undergo ulceration Ulceration. from mechanical irritation.

Discharges. 4. **Symptoms.** Metrorrhagia, discharges of mucus, mucopus, or bloody mucus, and the consequent anemia, Anemia. are the chief symptoms. Backache, dysuria, bearing-down sensations, and, indeed, all of the symptoms of endometritis Of endometritis. may be present. Absence. In some cases there are scarcely any symptoms.

5. **Diagnosis.** There is danger of mistaking inversion for a *fibroid polypus* Polypus. hanging from the *cervix* by a large pedicle, but a careful examination dispels all doubt.

Dark and soft. The inverted uterus is dark in color, and softer than a fibroid, and the sound Sound. introduced between it and the rim of the cervix finds no opening into the uterine cavity. A fibroid can be slightly twisted Twisting. on its axis without twisting the cervix, which is not the case in inversion (Reamy). Traction. Traction upon the uterus will sometimes temporarily invert the cervix, causing the cervical rim to disappear. The orifices of the Fallopian tubes Tubes. can often be detected, and sometimes the uterine mucous membrane is sensitive. Sensitive mucous membrane.

Bimanual rectal palpation reveals the absence of the uterine body Absence of body. above the cervix, and also demonstrates the cup-shaped depression Depression. of the inverted fundus, with the edges of the broad Broad ligament, etc.

ligament stretched over its lateral edges, and the ovaries lying near the rim on either side. The sound in the bladder and the finger in the rectum also detect the absence of the uterus. Sound, etc.

6. The diagnosis of inversion with a *fibroid tumor* attached to the *endometrium* presents greater difficulty. The uterus is often perceptibly darker in color, and softer, than the tumor below it. Darker and softer. If it is attached near the internal os, the intraperitoneal funnel as felt bimanually will not be formed all around. Funnel. The position of the entrances of the Fallopian tubes will indicate the position of the fundus whenever they can be discovered on the sides of the mass. Entrances of tubes.

Pozzi suggests putting an elastic ligature around the upper portion of the mass in doubtful cases, and cutting into it. Elastic ligature and incision. The capsule and appearance of the fibroid tissue in the one case, or the discovery only of normal uterine muscular wall in the other, will usually clear up the diagnosis. Appearance. The incision may be sewed up, or the fibroid enucleated, before the elastic ligature is taken off. Suture or enucleation.

7. **Prognosis.** In some cases a tolerance of the condition is acquired. Tolerance. When, however, frequent hemorrhages, anemia, and other symptoms are persistent, the patient is apt to lose ground steadily, and may die in the end, unless the local condition is remedied. Unfavorable termination.

8. **Treatment.** Inversion during involution can sometimes be reduced by taxis. Taxis. The fingers are brought together so as to construct a cone and pressed against one of the horns, or a finger is placed against one and the thumb against the opposite horn (Noegerrath), Pressure. while the other hand exerts counter-pressure over the abdomen against the cervical rim; Counter-pressure. or the hand grasps the fundus, and alternately compresses the fundus and stretches the cervix (Emmet). Compression and stretching. Such maneuvers will usually succeed only in very recent cases. Rarely succeed. When the uterus is swelled from hyperemia, it may be superficially incised to relieve the hyperemia and the cervix also incised in several Incisions.

places to relieve the pressure. Efforts at reduction are then more successful, although not without danger of extensive laceration of the cervix (Barnes).

Danger of laceration.

The daily application of galvanic electricity (40 or 50 ampères) by means of a large sponge in the vagina connected with the positive pole and a large flat abdominal electrode may have some effect in preparing the uterus for reduction. The faradic current used strong enough to cause some discomfort would be helpful in recent cases.

Courty recommended to pass two fingers into the rectum and over the cervical rim for counterpressure. Tate, of Cincinnati, introduced the index fingers into the rectum and bladder respectively, and the thumbs into the vagina, and effected reduction in a case.

Various appliances have been devised for the purpose of using firm pressure during attempts at forcible reduction. These consist either of a thick drumstick or a rod with egg-shaped or cup-shaped extremities. The cervix is sometimes held down by vulsella that catch in opposite sides of the cervix. All kinds of manipulation per vaginam, per rectum, per urethram, and from the abdominal walls have been employed, but without encouraging success.

T. Gaillard Thomas, and others following him, have opened the abdomen, dilated the funnel with dilators, and pressed the fundus up in place from the vagina. There is, of course, considerable danger to life connected with this method.

Preference. Packing vagina.

9. The *gradual methods* are almost always to be preferred. The one most often recommended is to pack the vagina with strips of iodoform gauze two inches (five cm.) wide, in such a manner that the fundus will be pressed upward in the direction of the axis of the superior strait, and the vagina be sufficiently stretched to make traction upon the cervix. The uterus is pushed into the vagina until the long axis approximates that of the superior strait, and then forced up as far as the vaginal walls will permit, and held there by the strips of gauze packed around and under the uterus. The patient should be kept in bed, and means be taken to secure regular evacuations of the bladder and rectum. The gauze should be removed every second day, the vagina douched out with a 1 : 2000 solution of corrosive mercuric chlorid, followed by a

Technic.

After-treatment.

Gauze.

Douches.

plain sterilized douche, and then be carefully repacked. From a few days to two weeks are required for the complete reduction. Time required.

The rubber bag or colpeurynter has often been used to effect reduction (Tyler Smith). Rubber bag. The axis of the uterus is made to correspond with that of the superior strait, the empty bag Axis of uterus. introduced under it and inflated with air and water (Fig. 194). Introduction and inflation. It is removed every twenty-four or forty-eight hours, and after disinfection of the bag, and also of the vagina, is reintroduced. After-management. The patient remains in bed.

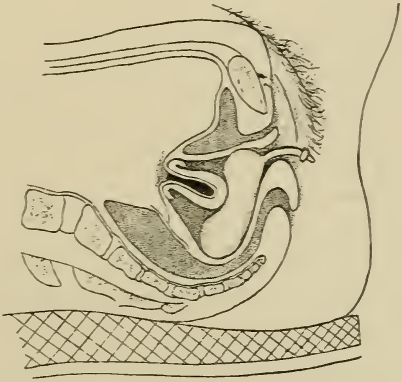


FIG. 194.—POSITION OF RUBBER BAG IN THE REDUCTION OF INVERSION.

10. As a last resort an elastic ligature may be put around Amputation. the cervix, the uterine body amputated, and ligatures be placed obliquely through the edges of the stump to unite the peritoneal edges and prevent hemorrhage (Kaltenbach).

It is a question whether it is not advisable for the experienced surgeon to perform vaginal hysterectomy rather than Vaginal hysterectomy. amputation.

CHAPTER VII.

DISPLACEMENTS OF THE OVARY. HERNIA OF THE OVARY.

Positions. 1. The ordinary *displacements* of the ovary are downward on the posterior surface of the broad ligament and in the recto-uterine pouch. Adhesions. The organ may be fixed by peritoneal adhesions, Enlargement. or it may be enlarged and movable, and connected Relaxation. with a relaxed condition of the peritoneum. Tube. The fimbriated end of the tube usually accompanies it. Its weight is sometimes sufficient to retrovert the poorly supported uterus, or, on Retroversion. the other hand, the retroverted uterus may drag back the normal-sized ovary.

Predisposing. 2. The predisposing **causes** are relaxation of the pelvic connective tissues, due to emaciation, debility, puerperal subinvolution, excessive coitus extending over a long period of time, etc. Exciting. The exciting causes are falls, heavy lifting, excessive straining at stool, uterine displacements, and shrinking of pelvic exudates.

Tenderness, etc. 3. The **symptoms** are moderate tenderness upon pressure, fixed pain in the iliac region radiating upward or downward, nausea, and dragging sensations in the pelvis. If there be adhesions, the symptoms of oophoritis, pain in the back, gluteal and sciatic regions, backache, painful defecation, dypareunia, and dysmenorrhea may be present.

Adhesions. Palpation of ovary, etc. 4. The **diagnosis** depends upon finding the tender ovary by the vaginal or rectal touch, either behind the cervix or at one side, and tracing its connection, bimanually, with the uterine horn. Pressure. Pressure upon it causes pain in the iliac region, and sometimes nausea, or, if there be adhesions, pain in the back.

Fecal masses. Fecal masses in the rectum are differentiated by being

Movability.

mashed with the vaginal finger or directly palpated per rectum. They are less easily moved than the non-adherent, and more movable than the adherent, ovary.

Replacement, etc. Tamponade, faradism, etc. General hygiene, etc. Pessary.

5. **Treatment.** Replacement of the retroverted uterus and Alexander's operation usually draw up the ovary when there are no adhesions. If the uterus is in a normal position, vaginal tamponade in the knee-chest posture, faradism of the pelvic tissues, pelvic massage (part I, chap. V, par. 8, 9, 10), cold vaginal or rectal douches, out-of-door exercise, iron, strychnia, laxatives, and a Thomas retroflexion pessary may cure the displacement, or at least relieve the symptoms.

Adhesions. Douches. Tampons. Massage. Forcible severance.

When the ovaries are adherent, hot vaginal douches and glycerin and ichthyol tampons are indicated for tenderness. Later pelvic massage may succeed in stretching or breaking up the adhesions to the extent of relieving pain. (Thuré Brandt.) In some cases the adhesions may be forcibly severed (Schultze) by the rectovaginal bimanual manipulation, under anesthesia (chap. IV, par. 8).

Suture of ligament. Oophorectomy.

In obstinate cases the infundibulo-ovarian ligament, at a point about ½ of a cm. ($\frac{1}{6}$ of an inch) behind the fimbriæ, may be sutured with two fine strands of silk to the parietal pelvic peritoneum immediately in front of the ligamentum suspensorium ovarii (Sänger); or one or both ovaries, if badly diseased, may be removed (part VII, chap. XI, par. 12 and 13).

Rarity.

6. **Hernia of the ovary,** which is a rare affection, may be congenital or acquired.

Congenital. Errors in development. Normal organs.

Congenital hernia is always inguinal, and two-thirds of the inguinal hernias are congenital (Puech). Cogenital hernia, occurring in connection with errors in development of the genital organs, is the result of an imperfect differentiation of the sex with a descent of the ovary through the inguinal canal as is normal for the testicle. When the organs are otherwise normal, a portion of the Wolffian ducts and gubernaculum may remain after the differentiation of the sex, and the ovary or ovaries descend into the labium instead of remaining in the pelvis (Englisch).

Acquired inguinal.

In acquired inguinal hernia, besides the patency of the inguinal canal there must either be a relaxation of the pelvic peritoneum and connective tissue, or the uterine body must be located in the anterior portion of the pelvis. The changes produced by pregnancy and parturition favor the occurrence of the hernia. Hernia of the ovary through the umbilicus, the greater sacrosciatic foramen, the femoral ring, and the obturator foramen has been observed in exceptional instances.

Other varieties.

At puberty. Tenderness, enlargement. Circulation. Ovaritis. Suppuration.

Symptoms do not usually appear until the time of puberty, the principal ones being tenderness and increase in size of the inguinal mass during menstruation. Occasionally the return circulation is interfered with, and symptoms of ovaritis develop. Exceptionally suppuration may take place.

Pressure. Shape. Inguinal ring Percussion. Absence of ovary. Dislocation of uterine horn. Movement with fundus. Sound.

The *diagnosis* is based upon the sickening sensation produced upon pressure, the correspondence in shape of the protruding mass to that of a normal or enlarged ovary, the discovery of the enlarged inguinal ring, the dull percussion note, the absence of the ovary from the pelvis as demonstrated by bimanual palpation, the dislocation of the corresponding uterine horn toward the inguinal ring, and the movement of the inguinal mass when the fundus is pushed toward the other side of the pelvis. The latter sign is more easily recognized if a sound is introduced into the uterus (Schroeder).

Shield. Taxis.

The palliative *treatment* consists in protection by a hollow covering held in place by elastic bands around the waist and inner surface of the thigh, until reduction can be effected. Reduction by simple taxis can not be accomplished in congenital hernia.

Herniotomy.

If taxis will not bring about reduction, herniotomy, with incision of the external ring and dilation of the canal, should be tried. The inguinal canal should be closed by suture after the ovary is reduced. Abdominal section, with traction from within the peritoneal cavity and pressure from without, has effected cures in a few cases. If all means fail, or if the ovary is degenerated or diseased, it may be removed through an incision made over it.

Abdominal section.

Oophorectomy.

7. *Acquired hernia* of the ovary may exist in the inguinal, crural, ischiatic, and obturator regions. It is usually the result of pregnancy and childbirth in women who have previously had a hernia. As a rule, it is accompanied by, and adherent to, the omentum or even the intestine, and is then difficult of recognition. The diagnosis and treatment are the same as for ordinary hernias.

Location.

Pregnancy, etc.

Complicated by omental or intestinal adhesions.

PART SEVEN.

INFLAMMATION AND HYPERPLASIA.

CHAPTER I.

INFLAMMATION OF THE VULVA.

VULVITIS, LABIAL ABSCESS.

Varities.

1. Vulvitis may be divided into the simple, gonorrheal, follicular, and phlegmonous varieties. Gonorrheal vulvitis will be considered elsewhere (chap. xv).

Hyperemia. Infiltration. Location. Exfoliation. Ulceration.

2. In **simple vulvitis** hyperemia and infiltration of the superficial tissues may affect the entire vulva, or may be confined to the parts just external to the hymen. More or less exfoliation of epithelium takes place, and patches of erosion or even ulceration may appear.

Discharge. Adhesion of labia.

The discharge is serous, mucoid, or mucopurulent, and may be abundant or scanty. In the latter case it is apt to become sticky in character, and in children often causes adhesion of the labia.

Germs.

When the discharge is purulent, staphylococci or streptococci are found in the secretion, but in many cases, particularly in those affecting young children, the saprophytic germs, and others whose characteristics are not so well understood, seem to be the dominant ones.

Extension.

A tendency to spread to the urethra, vagina, and vulvovaginal gland is characteristic of cases with purulent discharge.

Onset.

The disease may commence suddenly as an acute inflammation, or the onset may be gradual.

3. The *causes* are:

(*a*) *Irritating or septic discharges*, such as are present in septic endometritis, ulceration of the cervix, carcinoma, vaginitis, pelvic abscess, urinary fistula, etc. Diabetic or decomposed urine, and septic urethral discharges, are occasional causes.

Irritating discharges.

(*b*) *Irritants from external sources*, such as dirt, pinworms, chemicals, skin eruptions, etc.

Extraneous irritants.

(*c*) *Traumatism*, such as falls, blows, brutal attempts at coitus, rape, masturbation, friction in fleshy people, etc.

Traumatism.

4. The *symptoms* are itching, heat, and burning sensations in the parts, increased during walking or in urinating. The vulva is somewhat swollen, tender to the touch, reddened on the inner surfaces, and usually bathed with mucopus.

Itching, etc.

Changes in vulva.

In cases connected with irritating discharges, pruritus is apt to be present, and may be out of all proportion to the amount of apparent inflammation.

Pruritus.

5. The *treatment* should first be directed to the removal of the cause (par. 3).

Remove cause.

Copious vaginal douches of 1 : 4000 corrosive mercuric chlorid, or one per cent. carbolic acid, every six or eight hours, hot alkaline sitzbaths twice daily, and the constant application between the labia of cloths wrung out in 1 : 200 to 1 : 500 solutions of acetate of lead or carbolic acid may be employed. After the acute symptoms have subsided, five per cent. carbolized oxid of zinc ointment protects the parts, relieves itching, and benefits the inflammation. (See *Pruritus*, part III, chap. VIII.)

Antiseptic douches.

Sitzbaths.

Applications.

Ointment.

6. **Follicular vulvitis** is an inflammation localized in the sebaceous, piliferous, and mucous glands. When the external cutaneous surface is affected, the glands are distended with their natural secretion or pus, and form small projections upon the labia and prepuce from the size of a white clover seed to that of a small split pea, and occasionally larger.

Location.

Cutaneous surface.

Distended glands.

Inner surface. Discharge.

When the inner aspect of the vulva is affected, the glands do not always form visible projections. An offensive mucous discharge is in such cases usually found on the surface.

Same as simple vulvitis.

The *causes* are similar to those of simple vulvitis, infection from vaginal discharges being perhaps the most frequent.

As in simple vulvitis. Itching.

The *symptoms* are also the same as those of simple vulvitis. Intense itching is apt to be present when the disease affects the inner surfaces of the labia.

Strong antiseptics. Alkaline lotions. Destroy the follicles.

7. The *treatment*, in addition to that of simple vulvitis, requires strong antiseptics, such as 1 : 2000 corrosive mercuric chlorid. Alkaline lotions assist in dissolving out the secretions. When practicable, the follicles should be squeezed out, with or without previous puncture, and destroyed by a ten per cent. solution of silver nitrate, by the tincture of iodin, or by galvanopuncture.

Like abscess. Early evacuation. Excision.

8. **Phlegmonous vulvitis** possesses the same characteristics as abscess formation elsewhere, and should be similarly treated. On account of the tendency of the pus to spread, an early evacuation is indicated. In chronic cases it may become necessary to excise the cicatricial tissue and unite the raw surfaces by deep sutures.

CHAPTER II.

INFLAMMATION OF THE VULVOVAGINAL GLAND, KRAUROSIS, NOMA, ELEPHANTIASIS.

Infection. Secretion.

1. **Inflammation of the Vulvovaginal Gland.** The duct of the vulvovaginal, or Bartholin's, gland, may become infected by the discharges of vulvitis or vaginitis, particularly of the gonorrheal variety (chap. XV, par. 6). If the orifice is not closed, the secretion, even if purulent in the beginning,

may, as the inflammation subsides, become mucous in character. In many cases the duct becomes occluded and an accumulation of mucus (cyst formation) or of pus (so-called abscess) occurs, either superficially in the duct or more deeply in the gland proper. In many cases the gland escapes infection. Occlusion.

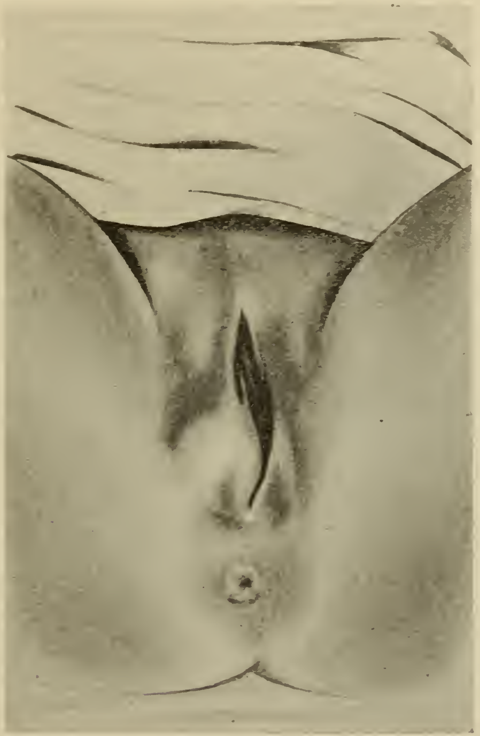


FIG. 195.—DISTENTION OF THE RIGHT VULVOVAGINAL GLAND WITH PUS.

2. The *symptoms* are tenderness and slight tumefaction of one or both labia, and a mucous or mucopurulent discharge that can sometimes be pressed out of the reddened orifice. Tenderness. Tumefaction. Discharge.

If the duct is occluded, there is a permanent or intermittent distention of the gland or its duct, producing a round, elastic, Distention.

Tumor of labium. Distress, etc.

tender tumor in the middle and lower portions of the labium, from the size of a hazelnut to that of a large walnut. If it is large or contains pus it may cause great distress, and prove an obstacle to coitus, or even confine the patient to bed.

Evacuation. Rupture. Repetition.

Sometimes the mucus or pus can be pressed out through the orifice; at other times, after a certain amount of painful distention, the gland empties itself. When pus is present, ulceration and rupture on the inner side of the labium may take place, followed by contraction of the opening and a repetition of the phenomena.

Baths, fomentations. Evacuation by patient. Washes.

3. The *treatment* of the milder cases consists in alkaline sitzbaths, hot alkaline fomentations, and evacuation of the gland by careful pressure performed by the patient several times daily. Antiseptic vulval washes are also of benefit.

Dilation. Aspiration and injection. Excision. Avoid packing. Simple aspiration.

When the duct is cystic, an attempt may be made to dilate it with a fine probe. If this fails, and evacuation of the gland or its duct does not occur within a few days, the mucus may be drawn off by a hypodermic syringe, and tincture of iodin or five per cent. carbolic acid in alcohol be injected. If this does not help, the gland should be excised, and the wound, after thorough disinfection with 1 : 2000 corrosive chlorid, be closed by deep sutures. Incision and packing is not to be recommended, as it is followed by prolonged suppuration. When, however, the gland itself has been cystic for a long time, the secretory function may have been abolished, and a simple aspiration under antiseptic precautions may result in a cure.

Incision. Excision. Primary union. Pregnancy.

When the contents of the cyst are purulent, the pus may be evacuated by incision in order to afford relief, but the gland should afterward be removed as recommended above. Primary union after removal, and thus an immediate cure, can nearly always be obtained if an antiseptic technic be adhered to. Pregnancy constitutes an indication rather than a contraindication to excision.

4. **Kraurosis vulvæ** is characterized by a sclerosis of the mucous membrane and skin of the vulva. It first shows itself on or about the labia minora as small red spots or streaks of dilated capillaries, which spread in curves, or disappear in one part to reappear in another. The microscope reveals round-cell infiltration beneath the epithelium. As the disease advances the membrane becomes pale and friable, and shrinks until the nymphæ may be obliterated and the vulva almost closed. The change has been likened to premature or advanced senile atrophy. It is due to the shrinking of the embryonic connective tissue, and the vulva may be likened to a broad contracting scar.

Sclerosis. Appearances. Infiltration. Pale and friable. Shrinking. Like senile atrophy. Scar.

In the beginning there is a hypertrophy of the epithelial covering and a dilation of the capillaries at the site of the red spots; later, a thinning of the rête mucosum. The sudoriferous and sebaceous glands disappear, and the papillæ grow smaller and finally disappear.

Epithelium. Capillaries. Rete mucosum. Glands. Papillæ.

5. The *cause* is unknown. The condition is probably due to the previous action of germs, that disappear as the disease advances.

Unknown. Germs.

6. The *symptoms* are often noticeable by their absence. Pruritus is one of the most frequent. Pain, and tendency of the parts to crack and bleed upon coitus or digital examination, are the most characteristic. The passage of the head during labor produces extensive superficial lesions. There may be a slight yellowish discharge, but ordinarily the surface is dry, smooth, and pale in the advanced stages. The progress of the disease is a slow one.

Absence. Pruritus. Pain. Coitus. Labor. Discharge. Surface. Progress.

7. The *treatment* is unsatisfactory, as nothing seems to check its progress. Strong carbolic acid seems to afford some relief. Excision of the affected parts, and sewing together the raw edges, seems to have given the best results. (A. Martin.)

Unsatisfactory. Carbolic acid. Excision.

Arthur W. Johnstone claims that the disease is a trachoma, identical in origin and nature with trachoma of the eye. He advises to introduce a speculum, cleanse the vulva and vagina with a spray of hydrogen dioxid solution, and apply to all parts affected an ointment containing from one to three per cent. of yellow mercuric oxid twice weekly. The patient should apply the ointment to the external parts twice daily. Less frequent applications should be kept up for many months after the symptoms have in the main subsided. (Trans. Am. Gyn. Soc., 1895.) Such treatment could only be beneficial in the early stages.

Character. 8. **Noma, or gangrene of the vulva,** is an exceedingly fatal disease, of infectious nature, and occurs, as a rule, in children living in unhealthy surroundings. Surroundings. The first signs are redness and infiltration of one of the labia, and an ichorous discharge. First signs. Soon a vesicle appears on the surface which assumes a grayish-green color and rapidly becomes gangrenous. Progress. The vital powers fail rapidly. Vital powers.

When seen before extensive infiltration has occurred, the affected parts should be promptly excised, Excision. and if the wound is too large to be sutured it should be disinfected every three or four hours by an efficient antiseptic, such as five per cent. carbolic acid, Disinfection. and be kept covered with cloths moistened in a weaker antiseptic solution, such as one per cent. carbolic acid, 1 : 3000 potassium permanganate, or 1 : 5000 mercuric corrosive chlorid, changing the ingredients of the application occasionally to prevent poisoning by absorption. Dressing. Alcoholics, strychnia, digitalis, and concentrated nourishment should be given, and pushed to the point of tolerance. General treatment.

9. **Elephantiasis vulvæ** is a rare affection in this climate, being a disease of the tropics. Tropical disease. It affects the labia majora, clitoris, and sometimes the labia minora. Parts affected.

It is characterized by a hypertrophy of the skin due to a diseased condition of the lymph vessels. Hypertrophy. Lymph vessels. There is dilation of the lymph spaces, stagnation in the lymph channels, and sometimes a filling up and obliteration of the lymphatics by proliferation of the endothelium. Lymph spaces and channels Endothelium. (Cornil and Ranvier.)

The appearance of the skin may be smooth (Elephantiasis glabra), warty (E. verrucosa), or papillary (E. papillomatosa). The consistence of the tissue may be hard or soft. The hypertrophy may produce an extended thickening of the skin, or may go to the extent of producing large tumorous masses hanging from the genitals and invading the surrounding areas. Varieties. Consistence. Thickening. Tumor-like masses.

Symptoms. There is a sense of dragging or weight about the vulva, but seldom any pain except such as comes from excoriations due to friction. Its development is very slow, often extending over years. Dragging, etc. Pain. Development.

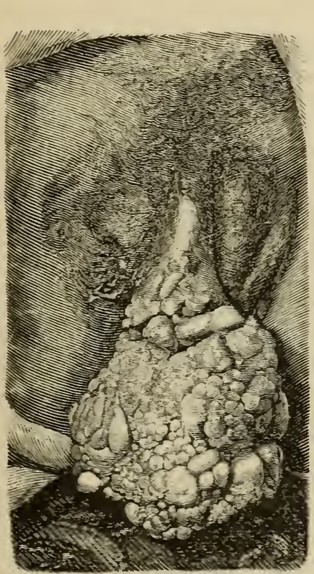


FIG. 196.—ELEPHANTIASIS NYMPHARUM. (*Winckel.*)

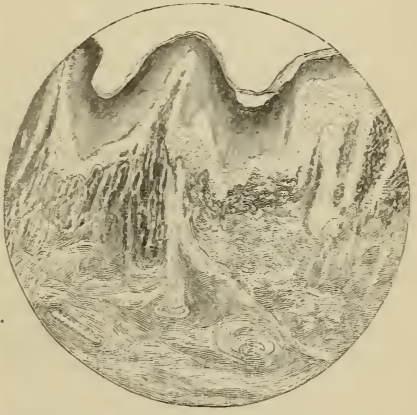


FIG. 197.—MICROSCOPIC SECTION OF PRECEDING FIGURE. (*Winckel.*)

Diagnosis. It can scarcely be mistaken for papillomata, which affects the surface instead of the entire thickness of the skin, nor for fibroma or lipoma, which are under the skin. Lupus is circumscribed and tends to ulcerate, while Papillomata. Fibroma. Lipoma. Lupus.

Carcinoma.

elephantiasis is diffuse, and its ulcerations or excoriations heal when the irritation is stopped. Carcinoma pursues a rapid course and ulcerates extensively.

CHAPTER III.

VAGINITIS.

Varieties.

1. Vaginitis may be divided into the following varieties: simple, gonorrheal, granular, adhesive, cystic, and aphthous.

Hyperemia. Infiltration. Epithelium. Secretion. Contents. Chronic form. Round cells. Acute inflammation. Epithelium. Absence.

2. **Pathology.** In the acute stage of *simple vaginitis* there are hyperemia and enlargement of the papillæ, and small-cell infiltration. The epithelium of the tops of the papillæ is shed, but it is thickened between them. The secretion in some cases is thin and slightly acid, in others it becomes alkaline and thick, in others purulent. Epithelial cells, leukocytes, saprophytes, various unknown germs, and sometimes streptococci and staphylococci are found in it. In the chronic form the infiltrated round cells in both the superficial and deep layers develop into inflammatory connective tissue. Foci of acute inflammation are disseminated through the deeper layers. The epithelium is irregular in size, shape, and thickness. In places it is absent, giving the appearance of ulceration.

Difference. Papillæ. Epithelium. Resemblance. Advanced stage.

3. *Granular vaginitis* differs anatomically from the above form chiefly by the more pronounced enlargement of the papillæ and more extensive exfoliation of the epithelium on them, causing the surface to resemble a mass of granulations. It represents an advanced stage of inflammation.

Surface. Extent. Ecchymosis. Papillæ. Secretion.

4. *In adhesive vaginitis* the affected surface is smooth, and the inflammation may be general or may vary in degree in different portions. Ecchymotic spots are sometimes found. The papillæ are small, but infiltrated with round cells, and sometimes denuded of epithelium. The secretion is thin and

scanty. The apposed surfaces tend to stick together and thus obliterate the lumen of the fornices, or even of the whole vagina. It is a disease of old people (senile vaginitis) and children, and is supposed to be connected with an imperfect state of nutrition of the parts. Adhesion. Age. Malnutrition.

5. *Follicular vaginitis* consists of an inflammation in the follicles that are occasionally situated about the vaginal fornices. The contents are often retained and give rise to small cysts containing mucus. Follicles. Cysts.

6. *Aphthous vaginitis* consists of a development of the *Oïdium albicans* and other fungi on the congested and more or less eroded vaginal surface. The vaginal portion of the cervix and the vulva may be likewise affected. Whitish patches of the deposit are found on the surface. Fungi. Cervix. Vulva. White patches.

Vesication of the vagina sometimes takes place as the result of local irritation, more particularly chemical irritation, and has given rise to the name *vesicular vaginitis*.

The so called *emphysematous vaginitis*, in which a development of gas is supposed to take place in small spaces and canals in the connective tissue and lymphatics, might be accounted for by a gaseous decomposition taking place in inflamed follicles, with passage of the gas through the cyst walls into the connective tissue. Pregnancy favors the development of this condition.

7. **Etiology.** The thick epithelial covering of the vagina renders it less liable to infection than either the vulva, urethra, or cervix. Comparative immunity.

(*a*) Local irritation with immediate or subsequent infection causes many cases. Thus pessaries, tampons, or other foreign bodies retained for a length of time, chemical irritants, traumatism, masturbation, and pinworms may produce lesions that become infected from germs present in the vagina. The urine, in cases of vesicovaginal fistula, may be the source of irritation. Secretions retained about foreign bodies, or by obstruction at the outlet, may undergo septic changes and become the source of irritation. Local irritation, etc. Enumeration. Urine. Retained secretions.

Direct infection. (*b*) Direct infection by septic uterine discharges from septic metritis, cancer, etc., may take place.

Extension. (*c*) Extension of a septic urethritis, vulvitis, or cervicitis accounts for many cases.

General conditions. (*d*) General conditions, such as pregnancy, tumors obstructing the pelvic circulation, chlorosis, anemia, etc., predispose to it, or, if it is already present, aggravate it. Exanthemata. The exanthemata are said to cause it.

Subjective. 8. **Symptoms.** *Acute* vaginitis is ushered in with sensations of heat and heaviness in the vagina and a slight rise of temperature. Vulval itching, a frequent desire to urinate, backache, nausea, nervous irritability, and a feeling of malaise are common symptoms. Objective. There is local tenderness, dyspareunia, and, if the menses appear, menorrhagia. The discharge, at first scanty, rapidly increases in amount, and sometimes has a disagreeable odor.

Less pronounced. 9. The symptoms of *chronic* vaginitis are similar in character but less pronounced. Absent. In some cases they are absent altogether, Leukorrhea. and nothing but a leukorrheal discharge (the whites) calls the patient's attention to the condition. General conditions. In some cases the general health becomes impaired, and even hysteria may be present.

Local signs. 10. The **diagnosis** is based upon the local tenderness, redness, and the appearances and discharges already described in "Pathology" (par. 2). When the discharge is abundant, the Cervix. cervix, as a rule, furnishes a portion of it, particularly if it is viscid in character (chap. VII, par. 6). In chronic cases the Speculum. cervix should be examined through a speculum.

Early cases. 11. The **prognosis** is ordinarily good if the case is treated early. Chronic. In chronic cases, particularly if the cause can not be removed, a cure may be difficult or impossible. Septic forms. In the septic forms the tendency to spread to the urethra, vulvovaginal glands, and uterus renders the prognosis less favorable.

General. 12. **Treatment.** In *acute vaginitis* the general treatment consists in quietude, saline laxatives, and a restricted diet.

The local treatment has for its main object the removal of the septic discharge which keeps up and spreads the infection. Discharge. Warm alkaline sitzbaths two or three times a day are beneficial. Sitzbaths. Copious vaginal douches of a saturated solution of Douches. boracic acid in hot water, lasting from fifteen to twenty minutes, Boracic acid. should be taken in the recumbent position every two or three hours in the daytime, and, if practicable, every four hours during the night. As soon as the soreness has subsided antiseptic douches, such as 1 : 4000 corrosive mercuric chlorid, Stronger antiseptics. or permanganate of potassium, or one per cent. carbolic acid, lysol, or creolin, should be used every three hours, and be continued for at least two weeks. After the first two weeks douches double this strength should be employed four times Increased. daily.

Urethral, vulvovaginal, and cervical discharges should receive Other discharges. attention to prevent reinfection.

When the vaginal douches are taken too far apart during the acute stage, they may do more harm than good, since they do not arrest the progress of the infection, and are liable to carry it to the cervix.

After the introduction of a speculum can be tolerated by the vagina, the dry treatment may be used. The vagina is thoroughly douched out as recommended above, the speculum introduced, the cervix and vagina wiped out with a 1 : 2000 solution of corrosive mercuric chlorid, and the vagina loosely packed with dry borated or iodoform cotton. This treatment should be repeated every eight hours until the secretion is pretty well checked, then twice daily. A dry absorbent dressing should be worn between the labia and changed every two hours.

13. In *chronic vaginitis* the stronger solutions recommended Strong solutions. in paragraph 12, and also astringent solutions, are used, such as one per cent. acetate of lead, sulphate of zinc, or alum, or 1 : 2000 potassium permanganate. In old cases a two per cent. solution of silver nitrate or the undiluted tincture of Silver nitrate. iron may be applied through a speculum. Tampons squeezed Iron. Tampons. out of these solutions may in some cases be left in the vagina for several hours, once every two or three days. Powders of Powders.

equal parts of tannin and iodoform, or of subnitrate of bismuth and chalk, kept in the vagina by cotton tampons and changed once a day, act well.

General condition. The condition of the general system should always receive attention.

Mild douches. 14. *Adhesive vaginitis* should be treated by douches of saturated solution boracic acid or 0.5 per cent. solution of Tampons, etc. acetate of lead. Tampons or strips of lint, soaked in a five per cent. solution of carbolic acid in glycerin or smeared with oxid of zinc ointment, are kept in the vagina between Supposi-tories. douches. Suppositories containing five per cent. each of iodoform and tannin, or ten per cent. of oxid of zinc, or two per cent. of acetate of lead, are more convenient and are often efficacious.

Douches. 15. *Aphthous vaginitis* requires antiseptic douches, packing Powders. with powdered borax, or iodoform and tannin, or vaginal Tamponade. tamponade with a 50 per cent. solution of boroglycerid in glycerin.

CHAPTER IV.

URETHRITIS.

Forms. 1. The urethra is subject to the same forms of inflammation as are other mucous membranes, and presents the same Pathological conditions. pathological alterations of structure, such as hyperemia, acute catarrhal urethritis, chronic interstitial urethritis, granular urethritis, follicular urethritis, ulceration, and a sacculated condition.

Injury. 2. *Simple hyperemia* when passive is the result of an impairment of the integrity of the parts, such as follows difficult labor, or of an interference with the circulation from uterine Intermitting active. displacement, varicose veins of the pelvis, etc. An intermitting active hyperemia sometimes exists in connection with an irritating quality of the urine, excessive coitus, etc. A certain amount of infiltration of the mucous membrane usually exists in cases of long standing, and constitutes in reality a mild form of urethritis. Infiltration.

3. *Acute catarrhal urethritis* is usually met with in a septic form, the result of infection. Round cell infiltration takes place, and in the severe cases, or those which last for some time, the deeper tissues are affected, and *chronic interstitial inflammation*, with thickening of the mucous membrane and encroachment upon the lumen of the urethra, results. As the inflammatory connective tissue, in maturing, contracts, there is a permanent narrowing of the urethra, or stricture. Usually septic. Infiltration. Deeper tissues. Lumen. Stricture.

Stricture in women is usually a narrowing of a large portion or the whole of the urethra, and is seldom small and circumscribed, as in men.

4. When hyperemia or moderate inflammation has existed for a long time, or has been repeatedly excited, the papillæ become hypertrophied and covered with young, imperfectly developed epithelium. This condition is called *granular erosion.* Papillæ. Epithelium.

5. *Follicular inflammation* is located in the mucous follicles about the urethral orifice. The principal follicles are Skene's glands, near the floor of the urethra, which extend upon each side from the meatus upward about ½ of an inch (1.5 cm.) or a little farther (Fig. 76). These, as well as the smaller glands or follicles, may discharge mucus or pus, and be surrounded with inflammatory products that cause a hyperplasia of the mucous membrane and sometimes closure of their orifices. Unless vigorously treated the condition is liable to last indefinitely. It may exist without participation of the upper portion of the urethra, although in many cases a general urethritis has existed and subsided. Follicles. Skene's glands. Discharge. Hyperplasia. Duration. Extent.

6. *Ulceration* may result when inflammatory conditions are

Aggravation. Specific.

aggravated by traumatism, such as the passage of calculi, frequent or awkward use of the catheter, etc., or by specific infection, such as the diphtheritic or venereal.

Laceration or overdistention. Contraction of meatus. Retention. Decomposition, etc.

7. As a result of the passage of a calculus, or of injury during labor, a laceration or overdistention of the middle portion of the urethra and some contraction of the meatus takes place, giving rise to retention of a small quantity of urine and urethral secretion. The retained fluid undergoes decomposition and perpetuates the inflammation.

Polyuria. Dysuria. Discomfort, etc. Color.

8. **The Symptoms and Course.** The symptoms of hyperemia are frequent urination, a slight burning sensation during micturition, and some discomfort or even pain in the urethra, particularly after coitus, active exercise, the ingestion of acids, stimulants, etc. The mucous membrane is deeper red than natural.

Itching. Scalding, etc. Appearance. Tender. Secretion. Subsides. Result.

9. *Acute catarrhal urethritis* begins with an itching sensation in the urethra, followed in a few hours by scalding during the passage of urine and a frequent desire to urinate. Upon examination, the meatus appears dark red, swollen, and pouting, and is exceedingly tender to the touch. Sometimes a small amount of mucopurulent or purulent secretion can be pressed out. Unless the bladder becomes infected the symptoms begin to subside in a few days, and may entirely disappear, or merge into those of the chronic form.

Septic urethritis, caused by purulent vaginal discharges, begins in a gradual manner, produces a purulent discharge which may be less abundant than the gonorrheal, but on account of the continuance of the infection is apt to continue longer and cause more suffering. Catheterization is liable to carry the infection into the bladder.

The tenesmus or desire to urinate due to urethritis must not be confounded with that of cystitis. That of urethritis can be restrained, is attended by scalding, and is relieved by the passage of the urine. That of cystitis is uncontrollable, not attended by urethral burning, and is not relieved by urinating. The tenesmus continues for a while afterward.

10. The symptoms of *chronic interstitial urethritis* are a

more than normally frequent passage of urine, and sometimes temporary inability to pass it on account of a stricture with spasm. Mild symptoms of acute urethritis are liable to follow coitus, prolonged exertion, etc. The finger placed in the vaginal entrance can in some cases feel a decided thickening of the urethra. A small sound can usually be passed without difficulty or pain but a large one encounters firm resistance and causes severe pain. Frequent passage. Inability. Of acute urethritis. Thickening. Sound.

11. *Granular erosion* produces great suffering during the passage of urine with distressing tenesmus. It is a persistent chronic disease, and affects old multiparæ more than young women. The meatus is large, deep red and granular in appearance, and sensitive to pressure. The urethra readily allows of the passage of a normal-sized sound, although not without some pain. Dysuria. Tenesmus. Chronic. Meatus. Sound.

The symptoms of *ulceration* are similar to those of granular erosion, but are variable in severity. A drop or two of blood is sometimes found at the meatus or on the patient's linen. Pressure on the urethra will find thickening and sensitiveness over some part of the canal, and the sound will usually find a spot of painful resistance within the urethra. Similarity. Variable. Blood. Pressure. Sound.

12. The symptoms of *follicular urethritis* are great tenderness about the meatus, discomfort in sitting and walking, dispareunia, stinging pain, and a continual sense of heat in the parts. (Skene.) Pain and frequent micturition are present in some cases. Tenderness, etc. Pain, etc.

The meatus looks red, puffy, and more or less everted, with projecting folds of hyperplastic mucous membrane simulating caruncle. Small areas of erosion are often found on the inner surfaces of the labia minora and under the posterior edges of the meatus, due to the irritation of the discharges. Small red spots, or areolæ, usually indicate the orifices of the inflamed follicles. Pressure upon the urethra behind the subpubic ligament sometimes forces out a little of the discharge. Appearance. Erosion on labia. Discharges. Spots. Pressure.

Ordinary symptoms. Urethral ridge. Catheter. Point movable.

13. The sacculated urethra presents the ordinary symptoms of urethritis, with marked enlargement, smoothness, and great tenderness of the urethral ridge under the pubic arch. The catheter evacuates a little turbid, more or less offensive urine as soon as it passes the meatus, and its point can be moved about freely in the dilated portion.

Removal of cause. Sitzbaths, douches. Internal remedies. Sound. Local applications. Faradism.

14. **Treatment.** *Simple hyperemia* usually subsides upon a removal of the cause. Warm sitzbaths, hot vaginal douches, and the internal administration of alkalies, buchu, and uva ursi sometimes act beneficially. The passage of a sound (No. 12 or 14, American scale) twice weekly, and the local application of astringents, such as the tincture of iron, after the sound is withdrawn, by means of an applicator, or the injection of an emulsion of bismuth once daily (Skene), or the use of a mild bipolar faradic current once daily, may be tried in persistent cases.

Diet, rest, baths, etc. Diuretics, etc. Irritation. Local treatment.

15. In *acute catarrhal urethritis*, a restricted diet, rest in bed, warm sitzbaths, saline laxatives, alkaline and diuretic remedies, copious draughts of bland drinks, such as lithia water, or slippery elm or watermelon-seed tea, and the avoidance of all sources of irritation, are indicated. Local treatment to the urethral canal is seldom called for unless the bladder is infected.

Dilation. Tinct. of iron. Carbolic acid. Caution.

16. *Chronic interstitial urethritis* and *stricture* should be treated by dilation of the urethra with the sound twice weekly, followed each time by a local application of tincture of iron. About once in ten days strong carbolic acid may be substituted. When these applications increase the symptoms they should be less frequently used or be omitted for a time, but the sound should still be used.

Same way. Stronger solutions.

Granular urethritis may be treated in the same way. The stronger solutions, such as strong carbolic acid or ten per cent. solution of silver nitrate or zinc chlorid, act best.

Dilation. Strong applications.

Chronic ulceration should be treated by dilation and the application of the above-mentioned solutions of silver and zinc, Ordinary.

or even stronger ones, to the ulcer by means of a urethral speculum. In recent cases the ordinary treatment for urethritis may suffice.

Puncture. Application. Skene's glands. Folds. Electro-puncture.

17. *Follicular urethritis* should be treated by puncture or incision of the mouths of the follicles and the application to them of the tincture of iodin, or of 95 per cent. carbolic acid, or of a mixture of equal parts of these. Skene's glands, if affected, should, after dilation of the urethra, be slit open their entire length. Large folds of mucous membrane projecting at the meatus should be anesthetized with cocain and snipped off with scissors, or burnt off with nitric acid. Cautery by electropuncture may also be used for obliteration of small follicles.

Dilating meatus. Strong astringent. Operation.

18. The urethritis accompanying the *sacculated urethra* can sometimes be cured by dilating the meatus, washing out the urethra, and applying a strong astringent, such as the tincture of iron, two or three times weekly. After the inflammation is cured, an oval or triangular strip of vaginal mucous membrane may be excised from under the urethra and the edges drawn together, and thus the walls of the canal be supported.

Buttonhole. Sound. Incision. Suture. Closing

In obstinate cases Emmet's buttonhole operation is required to drain the sac. A sound is introduced and cut down upon in the median line. The incision should commence about ½ of an inch (1.5 cm.) beyond the meatus and extend about ½ of an inch up the canal. The mucous edges of the urethra and vagina should be stitched together with fine silkworm-gut. It can be closed when the inflammation is cured in the same way as an artificial vesicovaginal fistula.

CHAPTER V.

CYSTITIS.

Grades. 1. All grades of cystitis are met with, from simple hyperemia to the fully developed parenchymatous, ulcerative, tubercular, and gangrenous. Special forms. As special forms, may be mentioned exfoliative, croupous, and diphtheritic.

2. **Pathological Anatomy.** *Hyperemia* in the beginning Temporary dilation consists of a temporary dilation of the capillaries and arterioles. Permanent. Repeated or long-continued hyperemia causes permanent dilation of these vessels, particularly of the venous radicles, and Ecchymoses and hemorrhage. even varicoses. Intense hyperemia may lead to ecchymoses in the mucous membrane or hemorrhage into the bladder. The blood. The effused blood may immediately pass off with the urine, or form coagula, or remain for some time and assume a coffee-ground appearance. If the hyperemia persists, some hypersecretion and infiltration of the bladder walls eventually result, Spurious cystitis. constituting a *spurious cystitis*.

Hyperemia. 3. In *acute cystitis* there is hyperemia, with shedding of the Epithelium. epithelium of the folds of the mucous membrane, and the Discharge. appearance of a mucopurulent fluid between them. Walls. The bladder walls are somewhat contracted. Ecchymosis. Ecchymosis is not infrequently found in patches.

Worse in places. In *chronic cystitis* the hyperemia is worse in places, and the Mucus, etc. mucous membrane is covered with thick mucus or mucopus. Coats. The submucous, muscular, and sometimes the serous coats are congested and infiltrated (parenchymatous cystitis), and Ulceration. ulceration, and even Destruction. destruction of portions of the muscular layers, may take place, particularly in the croupous and diphtheritic varieties. Urine. The urine frequently undergoes decomposition in the bladder.

Severe attacks. *Gangrene* may occur in severe attacks of acute cystitis supervening upon chronic inflammation. The mucous and submucous tissues become softened, dark in color, disintegrated, and fall off in shreds. The bladder is apt to become distended, and contains the decomposing urine, blood, pus, and tissue débris. Extreme distention from prolonged retention of urine during labor (Skene) may cause exfoliation of the entire mucous membrane (exfoliative cystitis).

Mucous membrane, etc. Distention. Contents. Exfoliation.

Severe and neglected forms of cystitis frequently spread to the ureters and kidney. Peritoneal adhesions may exist.

Spread. Adhesions.

4. **Etiology.** The causes of *hyperemia* and *spurious cystitis* are inflammation or congestion of the surrounding organs, catching cold, falls or bruises, pressure of tumors, traction by the displaced uterus, holding the urine too long, and irritating qualities of the urine from the use of stimulants or improper food, etc.

Surrounding disease. Colds, falls, bruises, etc.

The causes of *cystitis* are the various forms of infection, such as gonorrheal, ordinary purulent, diphtheritic, etc. There may be an extension of inflammation from the urethra or ureter, or direct infection by foreign bodies introduced, such as hairpins, catheters, etc. Habitual imperfect evacuations of the urine in connection with displacement, and hyperemia of the parts, are apt to result in chronic cystitis.

Infection. Extension. Direct infection. Imperfect evacuation, etc.

5. **Symptoms.** The symptoms of *hyperemia* and *spurious cystitis* are frequent painless urination, with tenderness over the bladder, and sensations of heat and weight about the pubes, which are increased by standing or walking. But a small amount of urine is evacuated each time, and is followed by a desire to pass more.

Polyuria. Tenderness, etc. Small evacuations, etc.

The urine may be normal, but if the attack lasts for a few days it contains more mucus than is normal, some blood globules, and an increase of epithelial cells. There is but little constitutional disturbance.

Urine. Mucus, blood, epithelial cells. General disturbance.

6. The symptoms of *catarrhal cystitis* are a frequent uncontrollable desire to urinate, with painful bearing-down sensa-

Uncontrollable desire. Bearing down.

But little passed.
Pains.

tions, after the bladder is evacuated. But little urine is passed each time, and no relief is obtained. Pains radiate from the bladder down the urethra and up through the abdomen, and are worse when the patient sits or stands.

Fever.
But little.

There may be considerable febrile reaction, although in chronic cases there is often but little systemic disturbance of any kind.

Contents of urine.
Ammoniacal.

The urine contains considerable mucus and more or less pus, blood globules, epithelial cells, and urinary sediment. In chronic cases it is frequently ammoniacal.

Obstruction.
Septic conditions.

In gangrenous, exfoliative, croupous, and diphtheritic cystitis retention of urine may be caused by the blocking of the neck of the bladder with the shreds of tissue or membrane. In such cases the general symptoms are such as belong to septic conditions.

Pain.
Contents of urine.
Vaginal discharge.
Appearance of bladder wall.
Urethra and neck of bladder.
Ulcer or fissure.

7. **Diagnosis.** The diagnosis of cystitis can be made from the character of the pain, and in septic cases by the presence of pus and blood or tissue débris in the urine. A septic vaginal discharge may indicate the nature of the inflammation. A cystoscopic examination reveals the redness and swelling of the bladder wall, or the ulcerated spots and denuded muscular tissue. In chronic cases, the upper urethra and neck of the bladder should be examined by the speculum for the purpose of discovering an ulcer or fissure that might occasion the symptoms.

Specific gravity.
Microscope.
Albumin.

The specific gravity is low in chronic cases—usually about 1010. The microscope reveals pus corpuscles, spheres of urate of ammonia, triple and amorphous phosphates, and organic dêbris. Albumin is found by the chemical tests out of proportion to the amount of pus and blood in the urine.

Good.
Difficult.

8. **Prognosis.** In hyperemia and *acute* cystitis the prognosis, with appropriate treatment, is good. *Chronic* cystitis, with ulceration, or adhesions to the neighboring organs, is difficult of cure, yet seldom incurable. Gangrenous, exfolia-

tive, croupous, and diphtheritic cystitis give a mortality of 45 per cent. (Winckel.) Mortality.

9. **Treatment.** In *hyperæmia* and *spurious cystitis* coming on suddenly the patient should take a sitzbath at a temperature of about 100° F., go to bed, and apply hot fomentations over the lower abdomen. If the tongue is coated or the urine dark colored, eight grains (½ of a gram) of pilulæ hydrargyri should be given, followed in six or eight hours by a saline laxative; if the tongue is clean the mercury may be omitted. The skin should be kept active by warm covering, but excessive sweating is to be avoided. A full dose of opium or of morphin, with gr. ¼ (0.015 gm.) of extract of belladonna, or of gr. $\frac{1}{60}$ (0.001 gm.) of atropin, may be given at bedtime. Sitzbath. Fomentations. Pil. hydrarg. Saline. Skin. Opium and belladonna.

In mild cases a teaspoonful every three hours of a mixture composed of three parts of the fluid extract of buchu or of pareira, with one of the tincture of hyoscyamus or of the tincture of conium, and half a teaspoonful of the bicarbonate of sodium every three or four hours, or liberal quantities of vichy or other alkaline mineral water, will often give relief. The diet should be light, and the bowels kept open by salines. Diuretics and anodynes. Alkalies. Diet. Stools.

Local or general pathological conditions that act as causes should be sought for and treated. Other conditions.

10. In the treatment of *acute cystitis* due to septic infection the remedies mentioned above may be used as palliatives, but the chief reliance must be placed upon local treatment. A vaginal douche of 1 : 4000 corrosive mercuric chlorid should be given every eight hours, followed each time by a bladder douche of a saturated solution of boracic acid or of a normal (0.6 per cent.) solution of table salt (part I, chap. IV, par. 4) for two or three weeks, or until the symptoms have subsided and the urinalysis shows no evidence of pus. Palliation. Local treatment. Vaginal douche. Bladder douche. Urinalysis.

In *subacute* and *chronic* cystitis various remedies have been used with benefit. Ten grains (0.66 gm.) of sodium salicylate every four hours, or the same quantity of boracic acid Remedies.

or of benzoate of ammonia dissolved in an infusion of buchu or uva ursi, or given with half a teaspoonful of the fluid extract of triticum repens, are the ones most often used. Electrocautery and the direct application of strong astringents or mild cauterizing agents can be made to fungosities or ulcers of the mucosa through the cystoscope.

Local applications.

When the bladder is contracted, a thin rubber balloon is rolled around an applicator, and warm gelatin impregnated with ten per cent. of ichthyol poured into the concavities made as the balloon is folded around it. The applicator thus armed is introduced through a urethral speculum into the bladder, and the balloon inflated until the bladder is unfolded and the medicament spread over the bladder walls (J. G. Clark, in "Johns Hopkins Hospital Reports").

Drainage.

11. In *chronic persistent cystitis* drainage of the bladder by means of a vesicovaginal fistula (T. A. Emmet) has sometimes effected a cure. A sound is introduced into the bladder, and the point turned down until it causes a projection on the anterior vaginal wall in the median line, which is then cut down upon until the bladder is opened. The incision should be made in the median line and about ⅔ of an inch (two cm.) long, and the edges of the mucous membrane hooked down with a tenaculum and stitched to those of the vagina with hardened catgut. Three or four vaginal douches of a saturated solution of boracic acid or one per cent. of creolin should be used daily. The opening may be maintained for several weeks if necessary, and can then be closed by splitting the vesicovaginal septum between the united edges of mucous membrane, and suturing them (part V, chap. III, par. 6).

Sound.

Incision.

Sutures.

Douches.

Opening closed.

If the urethra is not sensitive the bladder may be drained for a short time by means of a self-retaining catheter, as recommended after operations for urinary fistula (part V, chap. III, par. 7), instead of making the fistula.

Self-retaining catheter.

CHAPTER VI.

ACUTE ENDOMETRITIS. ACUTE METRITIS.

1. Inflammation of the uterus may be classified as follows :

(*a*) Acute Endometritis, or Acute Metritis.
(*b*) Chronic Cervical Metritis.
(*c*) Hyperplasia of the Uterus.
(*d*) Chronic Metritis.

Acute inflammation of the endometrium does not occur without some participation of the uterine walls, nor does inflammation of the uterine walls occur without participation of the mucosa, hence a description of metritis and endometritis as two distinct diseases would be useless, although the terms have a convenient descriptive value when we wish to refer to the portion chiefly affected, or to ignore a portion of the affected tissues.

ACUTE METRITIS. ACUTE ENDOMETRITIS.

2. **Pathology.** In *acute inflammation* the mucous membrane of the body of the uterus is hyperemic, thickened, and softened, and somewhat loosened in its attachment to the muscular wall. The epithelium is in part desquamated. The glands are but little changed, but the spaces around them are densely packed with embryonal cells. A mucous or mucopurulent discharge usually bathes the surface. Mucous membrane. Epithelium. Glands. Spaces. Discharge.

The uterus is more or less enlarged, according to the intensity of the inflammation. After labor or abortion it remains in a state of subinvolution. Its walls are hyperemic, swollen, and softened by the infiltration of serous or seropurulent fluid. Minute extravasations of blood are apt to be found in spots, particularly near the mucous membrane. Enlarged. Subinvolution. Walls. Extravasations.

The peritoneal surface may be merely hyperemic, or very much thickened, or covered by a flaky exudate. Peritoneum.

The cervix is in a state of hyperemia and serous infiltra- Cervix.

tion, and is apt to be extensively eroded. Lacerations are common.

Small abscesses have sometimes been found in the uterine walls, particularly in postpuerperal metritis. Madlener found a small abscess in the left uterine horn seven weeks after labor in a case of gonorrheal infection that had originated three weeks before labor.

When the inflammation affects the mucous membrane more than the walls it is termed *endometritis;* when it produces extensive changes in the walls it is called *metritis;* when it involves the peritoneal surface a *perimetritis* is added to the metritis.

Three kinds. 3. **Etiology.** There are three kinds of causes, viz.: those connected with (*a*) disturbance of menstruation and involution, (*b*) septic causes, and (*c*) traumatism connected with chronic inflammation in the uterus or its surrounding tissues.

Increase the menstrual congestion. (*a*) Catching cold, or other influences,—such as overexertion, excessive coitus, traumatism,—acting during the menstrual congestion, or after an abortion, may increase that congestion or interfere with its subsidence in such a manner as to be followed by acute inflammation.

Primary. Infected hands, etc. Secondary. Extension. Germs. (*b*) Among septic causes are infection during abortions, operations, examinations, uterine or vaginal douches, masturbation, etc., by means of infected hands, instruments, or other substances introduced into the genital tract. Infection may secondarily affect foreign bodies left in the uterus or vagina, such as the retained decidua after abortion, stem pessaries, tents, tampons, etc. Microbes connected with a vulval or vaginal disease may find their way into the endometrium. Streptococci, gonococci, and the saprophytes are the most common germs found. Chemical and vegetable poisons, such as phosphorus and the essential oils, when taken internally in excessive quantities, may also produce acute metritis (endometritis).

Varieties of trauma. (*c*) Traumatism, such as overexertion, sexual excesses, operations, rough examinations, etc., may produce acute metritis when there is already a chronic metritis, or a uterine congestion depending upon disease of the uterine appendages and surrounding peritoneum and connective tissue. Previous disease.

4. The first **symptom**, as in cases of acute inflammation elsewhere, is *fever*, which is sometimes preceded by a chill. The temperature may be but slightly elevated, or it may go up to 103° F., or even higher. Fever.

Pain of a dull, aching character is felt over the pubes, in the vagina, and in the lumbar region, often extending down the limbs. When the peritoneal surface is affected, the suprapubic pain is lancinating in character. In case the cervix be small, or flexed upon the corpus uteri, occasional colicky bearing-down pains are felt, and are due to painful uterine contractions. Pain. Aching. Lancinating. Colicky.

Tenesmus, dysuria, painful defecation, headache, and sometimes nausea are the chief *reflex* symptoms. Reflex symptoms.

Among *characteristic* symptoms may be mentioned suppression of the menses or lochia, if the attack begins during menstruation or in the puerperal state. In a few cases, however, metrorrhagia exists and persists. The uterine secretions are likewise suppressed, but in those cases called catarrhal, and which are largely confined to the mucous membrane, a thin transparent or turbid mucopurulent discharge usually makes its appearance within a short time of the onset of the disease. Characteristic. Suppression Metrorrhagia. Discharges.

When the endometrium becomes affected as the result of a preceding vaginitis, the transient dry stage, characterized by a suppression of the discharge, is not noticed because of the vaginal discharge. The symptoms in such cases may be very mild.

5. The chief *physical signs* are local tenderness over the pubes and tenderness of the uterus as determined by vaginal indagation and by bimanual pressure. Abdominal pressure exerted in consequence of coughing, straining, standing, sitting, etc., is usually painful. The cervix is softer, larger, and Tenderness. Abdominal pressure. Cervix.

redder than natural, particularly about the external os, and Uterus. when the uterine walls are affected the entire organ is considerably enlarged and softened.

When the inflammation is confined to the neighborhood of the mucous membrane there is but little swelling and tenderness of the uterus, but the discharges are abundant.

Varies. 6. The *course* of the disease varies according to the character Non-septic. of the inflammation. In non-septic cases connected with Temperature. menstruation the temperature may be quite high for one or two days, but it then begins to subside, and is apt to be normal Pain, etc. at the end of a week. The pain and tenderness diminish, but Backache, etc. some backache and slight tenderness may persist for several weeks.

In the catarrhal variety, or that which affects the mucous Temperature. membrane chiefly, the temperature seldom rises above 100° or 101° F., and in two or three days subsides to 99° F., or to Backache, etc. normal. A slight backache, and sometimes a burning in the Discharge. vagina, remain for one or two weeks longer. The discharge may continue for an indefinite period unless checked by prompt treatment of the disease.

Chills. In cases due to traumatism and infection, chills recur daily Temperature. or oftener, and the temperature rises every afternoon from two Perspiration. to four degrees, with profuse perspiration, and sometimes Diarrhea. with offensive diarrhea. The symptoms may gradually Progress. improve and pass off, or the chills may increase, the temperature go to 104° or 106° F. once or twice daily, and the pulse reach 120 or 140, while peritoneal pains, delirium, subsultus Changes beyond uterus. tendinum, and a dry, furred tongue indicate that the poison has already produced pathological changes beyond the uterus.

Death. Chronic inflammation. 7. **Prognosis.** Death seldom results, but chronic inflammation often follows. In severe septic cases, however, there is danger on account of the liability of the neighboring tissues Spread. to become affected with sepsis.

8. The **treatment** varies somewhat, according to the nature of the case.

Varies.

In those connected with sudden suppression of the menses the treatment already given for that affection is appropriate. The immediate reappearance of the menses is usually attended by partial or complete relief. Rest in bed for a few days, with hot fomentations and subsequent counterirritation, completes the cure. When the menses do not reappear, the patient must be kept in bed until the main symptoms subside, and then be kept quiet for a month, while counterirritation over the lower abdomen, mild laxatives, a bland diet, sitzbaths at a temperature of 100° F., and hot douches at 115° to 120° F. are faithfully used, with the intention of preventing the disease running into the chronic form. Scarification of the cervix and glycerin tampons may be tried in case there is no serious objection to a physical examination. At the time for the next period an attempt should be made to bring on the menses. (See part IV, chapter II, par. 17.)

Suppression of menses.
Reappearance.
Complete cure.
Do not reappear.
Quiet.
Counter-irritation.
Diet.
Sitzbaths.
Scarification.
Tampons.
Bring on menses.

9. When the disease results from decidual or placental remains, the uterus should be thoroughly curetted with a medium sharp curette, swabbed out with 95 per cent. carbolic acid, then douched out with corrosive mercuric chlorid, 1 : 2000, followed by a plain sterilized hot-water douche. A suppository containing a dram (four gm.) of iodoform should be left in the uterus.

Retained secundines.
Curettage, etc.
Iodoform.

If, however, the infection has been acting for some time, the uterine mucous and submucous tissues become infected, and it is necessary to repeat the intra-uterine douche twice daily, once with 1 : 3000 corrosive chlorid and once with two per cent. carbolic acid solution, followed each time by a plain sterilized douche to wash away the mercury or carbolic acid, which might otherwise poison the patient.

Prolonged infection.
Repeated douches.
Antiseptics.
Caution.

A uterine douche of a saturated solution of boracic acid, repeated every four or six hours, and lasting each time for half an hour or longer, may take the place of the stronger antiseptic douches in case there should be any signs of poisoning.

Sutures. Curette and cautery. Douches.

10. When the attack follows an operation, the sutures must be removed if any be present, and the wounded surfaces exposed, curetted, touched with strong carbolic acid, and treated with antiseptic douches of the same character as for retained placenta (par. 9).

Ice-bag. Morphin. Salines. Hot fomentations. Severe sepsis.

11. In all cases in which the onset is connected with much pain and fever, an ice-bag over the epigastrium acts beneficially as an anodyne and antipyretic as well as local sedative. One or more full doses of morphin may be required for pain and restlessness. The bowels should be moved by salines or other mild laxatives. After the more severe symptoms have subsided, hot fomentations are better than cold, which should usually not be used longer than twenty-four, or at most forty-eight hours, unless it be indicated for persistent high temperature. Severe septic symptoms call for large quantities of alcoholic stimulants, a concentrated liquid diet, and quinin in tonic doses.

Sitzbaths, tampons, and all local treatment that involves disturbance of the parts, should be avoided in the acute painful stage of the inflammation, unless necessary to remove infection. This is particularly true of cases connected with preëxisting inflammation.

CHAPTER VII.

CHRONIC CERVICAL METRITIS AND HYPERPLASIA.

Synonyms: *Endometritis Cervicis*, *Endocervicitis*, *Cervicitis*, *Cervical Catarrh*, *Trachelitis*, *Erosion of the Cervix.*

Hyperemia and hyperplasia.

1. **Pathology.** Chronic cervical metritis is characterized by hyperemia and hyperplasia of the cervical mucous membrane and underlying connective tissue, and hypersecretion of

the glands. The mucus secretion may be unaltered, or it may be thicker than normal; or it may become slightly purulent, or even bloody. In advanced cases it may become seropurulent. Glands. Mucus.

Exfoliation of the epithelium may take place so rapidly that the new epithelial cells, although sufficiently numerous to cover the entire surface, are small and imperfectly developed, and assume the character of slender cylindrical cells even on the vaginal portion that is normally covered by squamous cells. The surface has a red, denuded appearance, resembling ulceration. The condition is called *simple erosion.* Epithelium. Exfoliation. Cylindrical cells. Appearance.

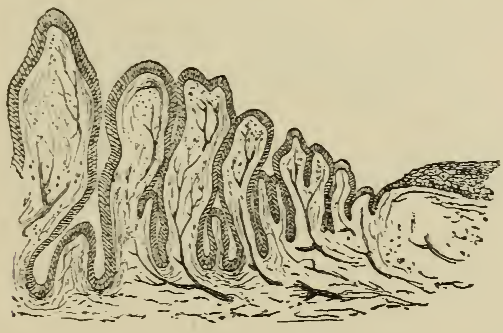


FIG. 198.—PAPILLARY EROSION. (*Schroeder.*)

2. As the hyperplasia increases, the swelling of the mucous membrane is out of proportion to that of the underlying walls, and is either thrown into a multitude of minute folds, or overfills the cervical cavity, dilates the external os, and rolls out into view. Swelling. Folds. Rolls out.

The first of these changes is called *papillary erosion*, for the small folds look like red papillæ. The young epithelial cells, which are numerous and small, are crowded on the surface so as to assume a slender, almost needle, shape, looking like palisades when seen in section under the microscope (Fig. 198). Red papillæ. Young cells. Palisades.

The glandular pockets formed by the folds reach down to Pockets.

and between some of the bundles of muscular fibers. These pockets, as well as the glands, may become stopped up and filled with secretion. The hyperemia about the mouths of the follicles and over the occluded and cystic follicles is called *follicular* erosion. The cysts thus formed are of all sizes, up to that of a pea (Fig. 199).

Occluded.

Hyperemia

Cysts.

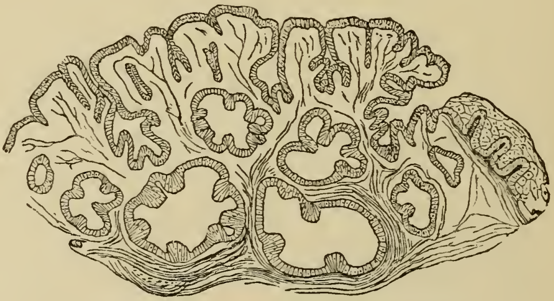


FIG. 199.—FOLLICULAR EROSION. (*Schroeder.*)

Pouting of membrane.

3. When the hyperplasia is great, the membrane forces open the external os and pouts out, giving the cervix the appearance as if the vaginal portion were partly clothed with cylindrical epithelium. The condition is called *eversion* or *ectropion.* Laceration of the cervix is a common complication of this condition.

Laceration.

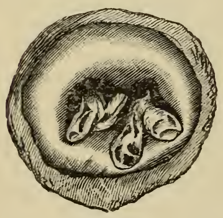


FIG. 200.—MUCOUS POLYPI GROWING IN THE CERVIX UTERI. (*Overlach.*)

More deeply.

Folds.

Polypi.

4. When the hyperplasia affects the structures more actively and to a greater depth, other changes are produced. The mucous membrane throws out large projecting folds that may or may not develop into *mucous polypi*, or polypoid masses. The glands may be occluded, developing retention cysts the size of a pea, or even larger, which project upon the surface. The pressure from the retained elements may cause *cystic degeneration.* Occasionally one large cyst the size of a hickory-nut or walnut is found

Retention cysts.

Degeneration.

Single cyst.

that stretches the tissues around it to the extent of almost obliterating a portion of the cervix.

As a result of these changes, all of the glandular structure may be finally destroyed, and a sclerosis, or hyoplasia, resembling senile atrophy, result. This may be regarded as a spontaneous cure. Sclerosis.

The interference with the circulation due to the hyperplasia, and the continued superficial irritation and imperfect formation of epithelium, may cause a varicose enlargement of small superficial vessels that can often be seen extending into the cervical cavity. The surface is smooth, and has the appearance of being contracted. The glands are destroyed, and the discharge is serous, seropurulent, or may be wanting. This condition is found in the last stages, and after the menopause.

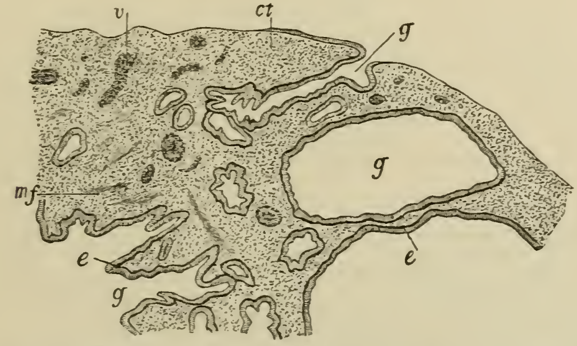


FIG. 201.—MICROSCOPIC SECTION OF A MUCOUS POLYPUS. (*De Sinéty.*)
g, g, g. Dilated glands. *e, e.* Epithelium. *mf.* Muscular fiber. *v.* Blood-vessel. *ct.* Connective tissue.

True ulceration, such as is found at the site of a laceration or cauterization of the cervix, has the appearance of granular erosion, and may after a time secrete a serous instead of a purulent fluid.

Cervical polypi may possess a cylindrical or a pavement epithelium. The former variety is, as a rule, benign, but the latter is apt to become transformed into carcinoma.

5. **Etiology.** The cervix is much more exposed than the More exposed to sepsis.

uterus to traumatism and septic influences, hence cervical endometritis is a more common disease than corporeal endometritis. The causes are:

(*a*) *The conditions attending corporeal endometritis.*

Simultaneously. Extension. From discharge. The inflammation may arise simultaneously with the endometritis, or in a spread of inflammation from the endometrium by contiguity, or from the irritation of the uterine discharge.

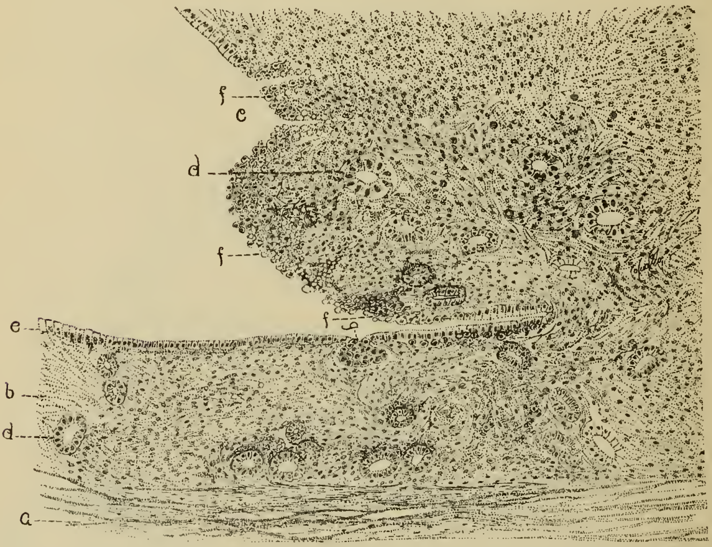


FIG. 202.—MICROSCOPIC SECTION FROM BASE OF A POLYPUS, DEMONSTRATING ITS ORIGIN TO BE FROM THE MUCOUS MEMBRANE. (*Prepared by Evans from Author's Case.*)

a. Uterine muscle. *b.* Mucosa. *c.* Polypus. *d, d.* Cervical glands in mucosa and in polypus. *e.* Epithelium covering mucosa. *f, f, f.* Epithelium piled in many layers. *g.* Orifice of gland.

(*b*) *Infection from the vagina.*

Extension. Infection. This may take place as an ascending inflammation from a purulent vaginitis. The vulvitis of children may be, or may become, septic, and spread to the vagina and cervix. Or the disease may result from the entrance of foreign bodies or septic germs into the vagina. Examinations, operations, coitus, masturbation, introduction of pessaries, vaginal douches, etc., may infect the cervix directly, with or without simultaneously infecting the less delicate vaginal membrane.

(*c*) *Traumatism, with immediate or subsequent infection.*

Lacerations of the cervix during parturition or abortion, operations upon the cervix, strong local treatment, attempts at abortion, etc., act in this way. Lacerations are the most frequent causes of the worst forms. (See part v, chap. v, par. 4.)

Lacerations. Operations. Treatment, etc Most frequent.

(*d*) *Conditions of lowered vitality and imperfect function* favor relaxation of the pelvic tissues and a sluggish pelvic circulation, and thus strongly *predispose* to the disease.

Relaxation. Sluggish circulation.

The vaginal mucous membrane in adults may resist infection that inoculates the delicate and complicated cervical mucous membrane. The diseased vaginal membrane may recover quite promptly and the cervical disease persist.

6. **Symptoms.** *Leukorrhea* is the most constant symptom. The discharge is usually abundant, and may be a thick, clear, stringy mucus, or a slightly yellowish mucopus. After mixing with the acid secretion of the vagina, it may appear at the vulva as a somewhat sticky, milk-white fluid called the whites. It may, however, be expelled from the vagina in stringy masses just as it comes from the cervix. When profuse it becomes debilitating. In the severer forms of erosion bright red blood, and in polypoid disease a brownish discharge in small quantities, are occasionally noticed.

Leukorrhea. Character. At vulva. Whites. Stringy. Profuse. Blood. Brownish discharge.

Sterility is common in cases without laceration, and may be due to the mechanical obstruction afforded by the swelling of the mucous membrane at the internal os, or by the tenacious plug of mucus that fills the cervix, or to disease in the uterus or Fallopian tubes.

Mechanical obstruction. Disease.

7. A burning pain in the vagina and bottom of the pelvis, with backache and sensations of weight in the pelvis, are the chief *subjective symptoms.* In cases of follicular degeneration with eversion, the irritation from the distended follicles is such

Pain, etc. Irritation of distended follicles.

that nearly all of the symptoms of hyperplasia and chronic metritis may be felt.

Reflex vomiting, headache, forgetfulness, and extreme nervousness are sometimes quickly relieved by a few local treatments consisting of evacuation of the cysts and obliteration by applications, and this after the failure of efficient medical treatment.

Softened rim around os.
Lower end of cervix.
Like carcinoma.
Like shot.

8. **Diagnosis.** *Digital examination* reveals a softened rim around the os, or, in cases of extensive cystic degeneration with eversion, a soft, elastic condition of the entire lower end of the enlarged or truncate cervix. When associated with laceration, cystic degeneration may produce an irregular, nodular, more or less hardened condition that might be mistaken for carcinoma. Isolated distended follicles sometimes feel like shot buried under the surface.

Simple erosion.
Papillary.
Ulceration.
Follicular erosion.
Patches.
Spots.
Project.
Punctured.
Not visible.

The *speculum examination* reveals the true condition. Simple erosion presents a bright red, glistening surface around or beside the os, or extending into it. Papillary erosions are of the same color, but have the appearance of consisting of fine granulations, or of delicate folds passing longitudinally up into the cervix. True ulceration produces less softening of the tissues than eversion, and is apt to present a coarse granular aspect. Follicular erosion may be indicated by several large, flat, or slightly elevated patches corresponding to the inflamed and cystic follicles underneath, or of small red spots corresponding to the inflamed mouths of follicles that are not much distended. When follicular cysts become superficial they project slightly, and may appear paler than the surrounding area. When punctured a drop of mucus is partly expelled, and adheres to the spot. Deep-seated cysts often produce no superficial redness, and their location may often be felt when they can not be seen.

With laceration, etc.
Red, mottled, etc.

Cystic degeneration, which is usually associated with lacerations, extensive eversion, and irregular enlargement of the cervix, produces a deep-red, or a mottled, angry-looking surface, upon which, in some cases, enlarged blood-vessels and raised cysts may be seen. Repeated punctures bring mucous drops of various sizes into view. Slight dilation of the cervix causes the viscid contents of the follicles to be expelled more abundantly.

Blood-vessels, raised cysts. Punctures. Dilation.

The inside of the cervix can be seen by dilating the external os and drawing the lips apart with tenacula. It is usually deep red in color. Either the bivalve or Sims' speculum may be used.

9. Cases of cystic degeneration or polypi may assume the appearance of malignancy. *Carcinoma* gives a crumbly, granular sensation to the touch when superficial, or a board-like, nodular feeling when interstitial, while the benign affections mentioned render the surface soft and velvety, with, perhaps, small, hard elevations corresponding to cysts. The color of cancerous ulcerations is lighter, with a yellowish cast, and they are often excavated, with ragged margins. Puncture of hardened or elevated spots in case of carcinoma causes them to bleed profusely instead of letting out mucus. *Sarcoma* and *myxosarcoma* may feel soft, but the symptom of hemorrhage is so pronounced that the seriousness of the trouble would soon be suspected. Microscopic examinations of excised pieces are sometimes necessary to clear up the diagnosis. (See diagnosis of cancer of the cervix, part IX, chap. III, par. 14.)

Of malignancy. Crumbly, granular, etc. Soft, velvety, etc. Color. Puncture. Hemorrhage. Microscope.

10. The **prognosis** in cases uncomplicated by inflammation of the endometrium or uterine adnexa is good with proper treatment; but the disease has very little tendency to get well of itself after the glands have become cystic until the diseased portion of the cervix has been destroyed by their rupture and obliteration. The cure, unless it be by radical operation, is often a slow and tedious one. After inflammation has existed for a long time in a severe form, the danger of malignant transformation must not be overlooked.

Good with treatment. Cystic conditions. Slow. Danger of malignancy.

11. **Treatment.** Simple and granular erosion, although of

Of acute inflammation. Sources and effects.

long duration and connected with chronic conditions, partake somewhat of the nature of acute inflammation. The sources of irritation must be removed and the effects counteracted by mild antiseptic and astringent applications. Endometritis, vaginitis, and urethritis, if present, should be treated, and uterine displacements corrected. Indigestion and malassimilation should be attended to, the evacuations from the bowels regulated, the condition of the blood improved by iron tonics, and the circulation and nervous and muscular tone treated by massage and active but carefully regulated out-of-door exercise and Swedish gymnastics (part I, chap. V, par. II).

Inflammations.

Indigestion, etc.

Bowels.

Tonics, massage, exercise, etc.

Antiseptic and astringent.

Vaginal douches of a one per cent. solution of carbolic acid, lysol, creolin, or lead acetate, or of 1 : 3000 potassium permanganate, used twice daily, have a beneficial effect upon the parts reached by them, and help to keep the vagina clean as well as to break up the cervical plug of mucus.

Boroglycerid.

Small cotton *tampons* soaked in a 50 per cent. solution of boroglycerid in glycerin may, with some benefit, be introduced by the patient every night after a douche, and removed the next morning before taking a douche.

Speculum.

Applications.

Effect.

Carbolic acid.

Boroglycerid and tampon.

Removal.

Astringent *local applications* twice or three times weekly through the speculum, such as the tincture of iron, a ten per cent. solution of copper sulphate, zinc chlorid, or lysol, are used to harden the infiltrated tissues and prevent the rapid exfoliation of epithelium. In some cases the application once a week of strong carbolic acid acts well. After the application a cotton pledget saturated with the boroglycerid should be placed against the cervix, and a wool tampon under that to act as a support to the circulation. They should be removed by the patient the next day at bedtime.

In all cases both the external and internal os should be well dilated with sounds, and the application applied freely on an applicator or forceps wrapped with cotton to the entire cervical cavity and to the vaginal portion. The mucus must first be well wiped out. A vaginal douche at 120° F. just before the treatment will usually coagulate it, or the astringent application, by repeated swabbing, may be made to do so.

The medicated pledgets or tampons consist of a small piece of folded cotton about the size of a spool of thread, with a string tied around it to facilitate its removal by the patient. The wool tampons are best made by separating the wool in layers about ½ of an inch thick, and cutting them in squares from three to five inches (8 to 15 cm.) in diameter. These pieces are then drawn out to about double their original diameter and placed upon a layer of cotton as large, or a trifle larger, but very thin. The four corners of both the cotton and wool are then drawn together, making a soft ball with the cotton on the outside, and the corners are tied together by a thread left long enough to reach from the cervix outside of the vulva. The best grade of commercial cotton is better for both the medicated tampons and the covering of the wool, for it retains the medicament longer, and keeps the wool dryer, than would the absorbent cotton, and irritates the vagina less than bare wool. Douches should not be used while the tampons are in place. If the best commercial cotton can not be obtained, an ordinary quality may be used after being sterilized by baking in a sterilizer or oven. (Part I, chap. IV, par. 9 and 10.)

Boracic acid and other powder may be placed against the cervix above the tampon, but they sometimes produce mechanical irritation and do harm instead of good.

Dry medicated cotton tampons have been used with benefit. (Engelmann.)

12. In the treatment of *follicular erosion* our endeavor should be to disinfect the glands and obliterate those follicles whose functions are already destroyed by the inflammation. Carbolic acid, compound tincture of iodin, and a mixture of equal parts of carbolic acid and tincture of iodin are among the most efficient remedies. Dilation of the cervix just prior to the application assists in some cases by causing an evacuation of the contents of the follicles. When the outlets present the appearance of a multitude of red points, it is well to lightly scarify the whole surface, for the purpose of relieving the congestion, evacuating small cysts, and preparing the surface for the penetration of the remedy to be applied. The punctures should be allowed to bleed a little, and the bleeding

Disinfect. Obliterate follicles.

Applications.

Dilation.

Evacuation.

Scarification.

Bleeding.

Iodin, etc. Ichthyol. Tampon. Injection.

then be checked if necessary by pressing absorbent cotton firmly against the cervix. After that the compound tincture of iodin or other remedy should be applied, and a small tampon of cotton saturated with a ten per cent. solution of ichthyol in glycerin placed under the cervix to maintain the antiseptic and alterative action. A wool tampon is then inserted in the vagina, and both tampons are left for the patient to remove the next day at bedtime. A hot injection of 1 : 2000 solution of corrosive mercuric chlorid is used and repeated twice daily, except while the tampons are in.

Potassium permanganate 1 : 3000, or carbolic acid one per cent., may be occasionally substituted for the corrosive murcuric chlorid for a week or two at a time, to avoid the danger of mercuric poisoning. Two quarts should be used at a time.

Deeper and stronger. Cysts laid open. Applications. Nitric acid. Electrocautery. Caution.

13. *Cystic degeneration* of the cervix may be treated in the same way, except that the punctures must be deeper and the application stronger. The cysts must be laid wide open and carbolic acid, solution of acid nitrate of mercury, or a mixture of equal parts of carbolic acid and tincture of iodin be applied. When there is eversion and great redundancy of tissue, and the degeneration affects some parts more than others, fuming nitric acid or the electrocautery may be applied to the worst places. A general application of nitric acid or other powerful caustic is not advisable on account of the danger of producing stenosis.

Excision of tissues.

When there is extensive degeneration of the mucous membrane with laceration and eversion, the mucous and submucous tissues should be excised after the manner recommended by Carl Shroeder. (See part v, chap. v, par. 11.)

Cut off, cautery.

Polypi should be cut off and the tissue about their base cauterized.

Douches. Applications.

Ulcers of small size call for antiseptic douches and occasional local applications such as were recommended for follicular erosion (par. 12). Large ulcers should be treated by an excision of tissue that will allow of an approximation of the raw surfaces or of the mucous membrane over them. Excision and approximation.

CHAPTER VIII.

HYPERPLASIA OF THE UTERUS AND HYPERPLASTIC SUBINVOLUTION.

(*Glandular Endometritis, Hyperplasia Mucosæ Uteri, Hyperplasia Interstitialis, Simple Endometritis, Menstrual Subinvolution.*)

DILATION AND CURETTAGE OF THE UTERUS. BENIGN ADENOMA.

1. **Pathological Anatomy.** Hyperplasia may affect the endometrium and uterine walls in different degrees. Parts affected.

The *mucous membrane* may be from two to ten times as thick as normal and of a dark red color. Near the surface extravasations of blood are frequently found, which give rise to a mottled appearance. The enlarged and pouting mouths of the glands can be seen by the naked eye. The surface is soft and vascular, in some cases smooth, in others partly or Macroscopic appearance of mucous membrane.

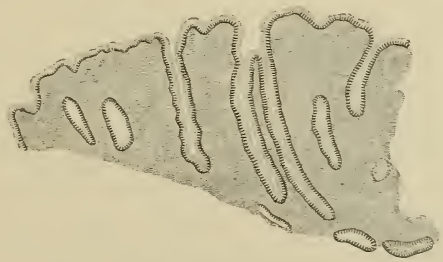


FIG. 203.—VERTICAL SECTION OF NORMAL MUCOUS MEMBRANE. (*Van Tussenbroek and Mendes de Leon.*)

completely covered with elevations of a papillary or cystic nature. At other times the uterine cavity is filled with a large hypertrophied glandular mass.

Of uterine walls.

The *uterine walls* are more or less hyperemic, softened, and enlarged, but after a time become harder and firmer, and may return to their natural size or become smaller than natural.

Of cervix.

The *cervix* may participate to a certain extent, or it may be small, anemic, and bent forward in the long axis of the vagina. Simple erosions on the posterior wall are not uncommon, and may be due to the constant flow of mucus over it.

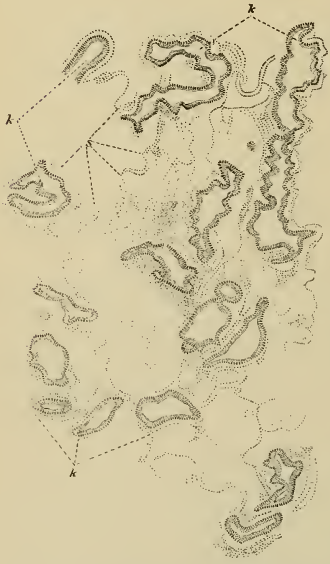


Fig. 204.—Hyperplasia of Uterus with Glandular Hypertrophy. Leitz, Obj. 7. (*Van Tussenbroek and Mendes de Leon.*)
k. Glands. *s*. Stroma.

Microscopic appearance of mucous membrane.

Glandular hypertrophy.

Surface.

Shape.

Epithelium.

2. Microscopic examination reveals various conditions of the *mucous membrane*. In one of these the predominant feature is an enlargement or hypertrophy of the utricular glands, causing them to project upon the surface as irregular apertures with dentated edges (Fig. 204), and form lateral projections beneath the surface, or even to assume corkscrew or other exaggerations of the normal irregularities in shape (Fig. 205). The epithelium undergoes proliferation, but never grows through the basement membrane.

Proliferation of epithelial cells.

When, however, the stroma is firm, and prevents the expansion of the glands, the proliferation of the epithelial cells within the glands, and to a variable extent about their mouths, has the effect of pushing them over each other, and thus gives the appearance of two or more layers (Fig. 217).

Glandular hyperplasia.

In another class of cases there is a more noticeable increase in the number of the glands (glandular hyperplastic endometritis of Ruge. Figs. 207 and 218).

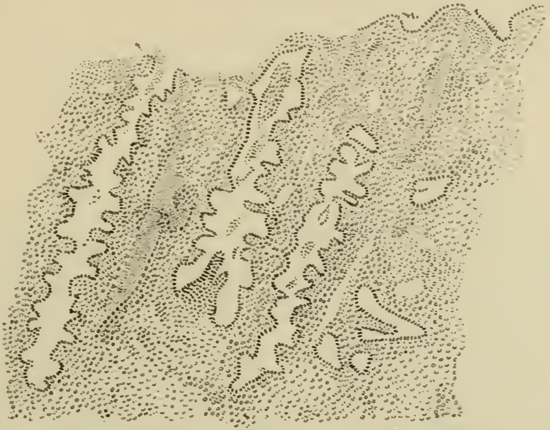


Fig. 205.—Hyperplasia of Uterus with Glandular Hypertrophy. (*Zweifel.*) Vertical section.

Inter-glandular connective tissue and vessels.

Polypoid. Benign adenoma.

In addition to the above-mentioned changes there is an increase of the interglandular connective tissue of the endometrium, and an enlargement and multiplication of the blood-vessels, giving rise to more or less softening and thickening of the whole or a portion of the membrane. These changes may be so extensive that a fungous or polypoid condition, or that of benign adenoma with cyst formation may result. This variety of hyperplasia is apt to be preceded or accompanied by interstitial endometritis. (Fig. 208.)

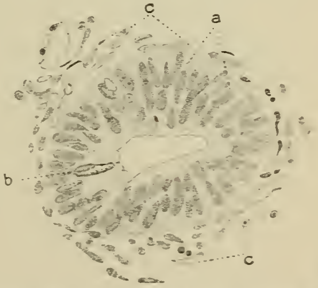


Fig. 206.—Transverse Incision through a Gland with more than one Layer of Epithelium. (*Van Tussenbroek and Mendes de Leon.*)

a. Gland epithelium. b. Mitosis in epithelial cell. c, c. Concentric stroma cells.

At first there is an increase in both the number and size of

Destruction of arterioles and atrophy.

the arterioles. As time passes a large portion of them are destroyed by, first, endometritis obliterans, and, second, by contraction of maturing inflammatory connective tissue. From this atrophy of the thickened mucosa results.

Microscopic appearance of uterine walls.

Round-cell infiltration and hyperemia of the *uterine walls* may exist to a moderate degree under the mucous membrane for a long time, but finally the development of organized connective tissue in the walls of the uterus and blood-vessels causes anemia and shrinkage of the uterine tissues and compression of the glands. (Fig. 209.)

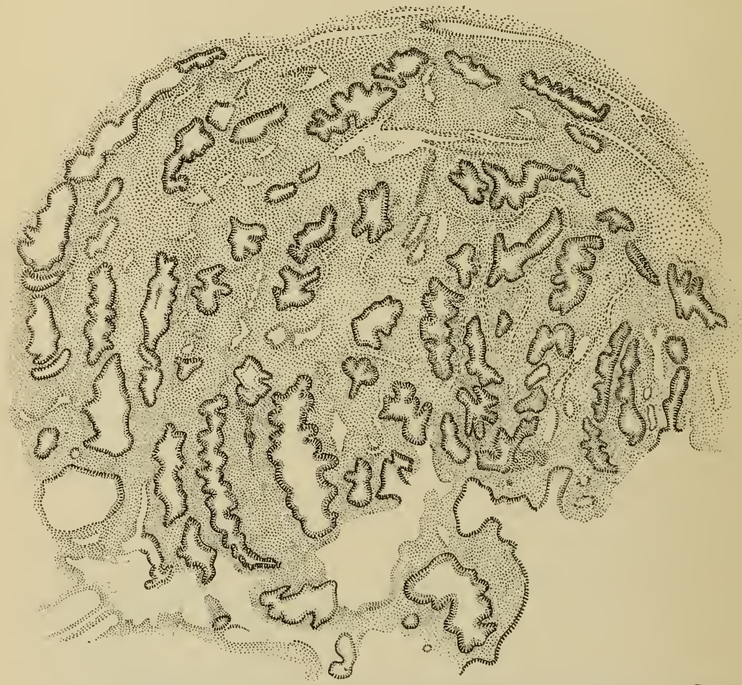


FIG. 207.—HYPERPLASIA OF UTERUS WITH HYPERPLASIA OR MULTIPLICATION OF THE GLANDS. Leitz, Obj. 3. (*Van Tussenbroek and Mendes de Leon.*)
Horizontal section of mucous membrane.

In cases beginning after labor, the uterine muscular fibers

Hyperplastic subinvolution.

may remain enlarged, and the entire genital canal be in a state of subinvolution. The uterus is enlarged more in its long diameter, and the os merely widened, or it may be decidedly lacerated and inflamed. For some time after labor the uterine walls are thicker and softer than natural, and the cervix and vagina purplish in color; but in time the uterus becomes hardened and somewhat flattened, and the cervix paler in color, constituting *hyperplastic subinvolution.*

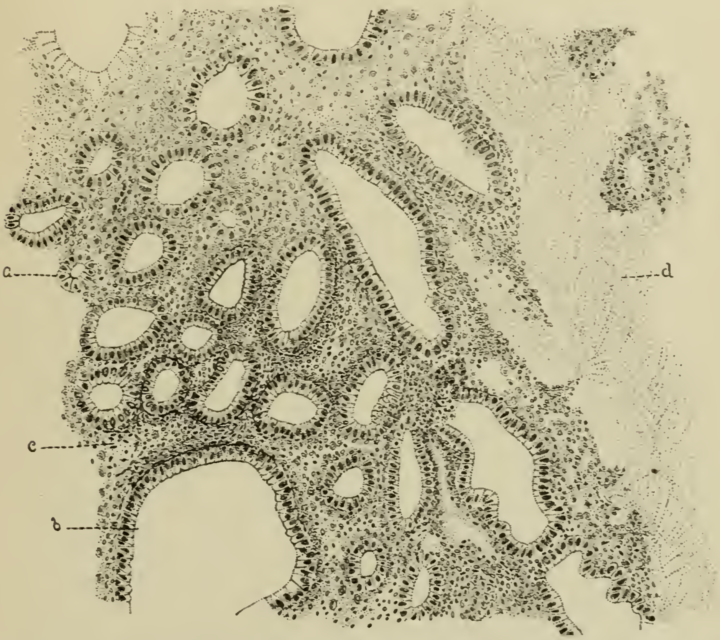


FIG. 208.—HYPERPLASIA, WITH ADENOMATOUS CHARACTER. (*Evans' Preparation from Author's Case.*)

a. Uterine gland. *b.* Cystic uterine gland. *c.* Round lymphoid cells. *d.* Blood clot.

3. **Etiology.** The causes are prolonged uterine congestion from —

(*a*) *Interference with the uterine circulation by mechanical means*, such as uterine displacements, pelvic or uterine tumors (notably fibroids), or exudates, inflammations, or other morbid processes in or about the pelvis, masturbation, onanism, excessive coitus, etc.

(*b*) *Disturbed menstruation* from taking cold, fatigue, continuous exertion during menstruation, stenosis of the cervix, oophoritis, etc.

(*c*) *Disturbed involution* after abortion or labor, by coitus, blows, displacements, getting up too soon, retained secundines, lacerations of the parturient canal, etc.

Continued irritation.

(*d*) *Imperfectly cured inflammation*, instead of leading to glandular atrophy, may maintain a moderate irritation and hyperemia that results in excessive glandular activity and hyperplasia.

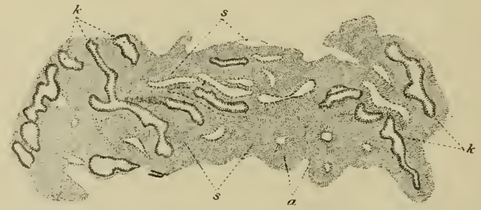


Fig. 209.—Commencing Atrophy of the Mucous Membrane. Leitz, Obj. 3. (*van Tussenbroek and Mendes de Leon.*)
Horizontal section *k*. Glands. *s*. Stroma. *a*. Arteries.

In the majority of cases, particularly in young girls, there is no history of an acute attack of congestion or inflammation, or it has been forgotten. Excepting suppression of the menses, the causes in nulliparæ act insiduously, and are repeated until they gradually bring on the condition. Whether or not some form of infection is necessary to uterine hyperplasia is difficult to determine. Many cases are undoubtedly due to it, although it has disappeared, or can not be discovered. An anemic and debilitated condition is supposed to lead to it. The flow is not as regular and abundant as it should be, the uterine hyperemia is not sufficiently relieved, and hyperplasia of the endometrium results.

Doria discovered protozoa both on the surface and in the epithelial layers in cases of hyperplasia with multiplication of the glands (endometritis glandularis hyperplastica) that were examined by him. In two of these cases he found bacteria present, in one he did not. The protozoa were present in considerable quantities and gave unmistakable evidences of ameboid movement.

4. **Symptoms.** *Menorrhagia* is the most common symptom. The flow may be abundant and clotted, or it may last longer than normally. Cases originating after labor from adherent particles of placenta are sometimes remarkable for a free hemorrhage that takes place when the patient begins to sit up or go about, or by a menorrhagia commencing in six or eight weeks after confinement, although lactation may still be going on.

Character of menorrhagia.

Metrorrhagia in late puerperium.

Metrorrhagia during lactation.

Leukorrhea is usually present between the periods. It is most abundant during the first few days following it, and may then almost subside until the next month. The discharge consists of a thin, clear, or slightly turbid mucus containing some epithelial cells and perhaps lymph corpuscles. As it appears at the vulva it is milky white or greenish in color, owing to a mingling of the alkaline cervical and uterine with the acid vaginal secretions. When mixed with blood the discharge may acquire a pink, brown or smoky tint.

After menstrual period.

Character of discharge.

Appearance at vulva.

The normal uterine discharge has the character of a thin mucus ; that of the cervix of a thick viscid mucus ; that of the vagina of a thin, slightly milky fluid.

As the uterine discharge is mixed with the cervical and vaginal secretions on its way to the vulva, it is usually impossible, without an examination, to determine what is the character of the uterine discharge or whether there is any uterine discharge. By wiping out the cervix and dilating the internal os, we can sometimes cause the expulsion of some of the intra-uterine discharge, although by our manipulations we are apt to abrade the mucous membrane and cause the admixture of a small amount of blood with it.

Leukorrhea is said to depend in some cases upon anemia and chlorosis.

5. *Pain* is absent in many cases, while in others it is a prominent symptom. The lumbar and sacral regions are perhaps its most common and characteristic locations. Pain in one of the iliac (ovarian) regions, sensations of weight in

Variability.

Backache.

Iliac.

Pelvic. Urethra and rectum. Nervous system.

the vagina or pelvis, irritability of the urethra and rectum, and headache and intercostal neuralgia, are frequently observed.

Alimentary canal.

6. Indigestion, gastro-intestinal fermentation, gastralgia, abdominal pains, meteorism (bloating), and constipation, with accompanying anemia, debility, mental depression, and palpitation of the heart, are among the effects of the disease upon the *alimentary canal.*

Neurasthenia and hysteria.

7. Besides pain there are other *nervous symptoms* and conditions which demand attention. Neurasthenia and hysteria, with perverted mental action, such as a tendency to exaggerate symptoms, insomnia, fits of alternate hilarity and sadness, unreasonable irritability, mental depression bordering on melancholia, hysterical spasms resembling catalepsy or epilepsy, simulated or even real insanity, are the most important.

The conditions mentioned in the last two paragraphs are partly due to the direct effect of the uterine inflammation and hemorrhage, and partly to the sedentary habits necessitated by the disease, and partly to improper diet, unhealthy hygienic surroundings, and to the unnatural demands upon the nervous system incident to the customs of civilization.

8. *Sterility* is a frequent but not necessary result of the disease. The ovum may be washed away by the secretion and form an attachment, or it may be regularly aborted.

Enlargement. Mobility. Consistence.

9. **Physical Signs.** A slight symmetrical enlargement of the uterus is felt bimanually in pronounced cases. Unless parametritis be present the organ is freely moveable upon the finger. In the early stages it is somewhat softer, but after a long time it may become harder than normal.

Depth of canal. Endometrium sensitive. Syncope.

The sound enters to a distance of about three inches (eight cm.). Its introduction is ordinarily, although not invariably, painful, the most sensitive spots being the internal os and the fundus. Occasionally patients become nauseated, and some have been known to fall down in syncope upon attempting to assume the erect position soon after its passage. The withdrawal of the sound is followed by a gush of thin, clear or bloody mucus; or a little mucus or blood may be found on the end of the instrument. Discharge.

10. **Diagnosis.** When, from the abundance of the hemorrhage or mucous discharge, or the severity of other symptoms, septic or gonorrheal endometritis, carcinoma, sarcoma, adenoma, or retained decidua are suspected, the discharges should be examined by means of culture media or through the microscope, or a portion of the endometrium should be removed by the curette for the same purpose. Examination of discharge.

When accompanied by subinvolution the uterus is considerably enlarged in its long diameter. Enlargement from intra-uterine growths or pregnancy makes the uterus decidedly rounder, or larger, anteroposteriorly in proportion to the increase in length. Neoplasms of the uterine walls increase the size of the uterus irregularly.

11. The **prognosis** is usually favorable in the earlier stages. Favorable early. In long-standing cases with decided uterine enlargement, the treatment must be a prolonged one, and the cure may be imperfect. Prolonged treatment. Lasting impairment of health, due to hemorrhages, digestive disorders, and nervous conditions, attend a certain proportion. Lasting effects.

The possibility of malignant transformation should not be forgotten.

12. **Treatment.** Cases with profuse menorrhagia and unaccompanied by tumors or diseases in the adnexa or pelvic peritoneum or connective tissue, cases having considerable thickening of the mucous membrane, or polypoid formation, and, in general, cases that have resisted long-continued local treatment, should be subjected to uterine curettage. Cases requiring curettage. The operation, for the sake of thoroughness, ought to be done with the patient under the influence of an anesthetic, and be followed by rest in bed from six to ten days. Anesthesia. Rest.

Thorough antiseptic preparations should precede the opera- Curettage.

tion (see part I, chap. II). The patient is put either in Sims' left-lateral or in Simon's dorsal posture, and the cervix grasped by tenaculum forceps. The vaginal entrance is held open by Sims' speculum or vaginal retractors. The cervix is slowly dilated from ½ to one inch in diameter by means of Wathen's dilator (Fig. 22), and the uterine cavity wiped out with gauze and douched with a 1 : 2000 solution of corrosive mercuric chlorid and then with plain sterilized water. The endometrium is systematically removed by means of a medium sharp curette with a copper edge (Fig. 25). As the endometrium is soft, the sharp steel edge of Sims' or Simon's curette is not needed, and is liable to remove the membrane too deeply, or even perforate the uterus. The dull wire curette, however, is useless. The uterine cavity should be gone over a second time with the curette, and douched out with the 1 : 2000 corrosive mercuric chlorid solution followed by sterilized water. It is then to be swabbed out with lysol, or equal parts of carbolic acid and tincture of iodin, or with Churchill's tincture of iodin, by means of an applicator wound with cotton, and then again douched out with sterilized water. Many operators prefer to inject ½ of a teaspoonful of the strong application with a long-nozzled piston syringe (Fig. 20). It is well, as the last step, to pack the uterus and vagina lightly with sterilized gauze (preferably iodoform gauze) cut into narrow strips. The gauze should be removed in twenty-four hours.

Snegirjeff's method of steam-cautery of the uterus has been made use of in the treatment of cases of hemorrhagic hyperplasia of the uterus (Panecki). Pat'ha demonstrated that the introduction of superheated steam (from 105° to 115° C.) for a half or whole minute caused a superficial necrosis of the mucous membrane. The slough was two mm., or about a line, thick within the cervix, against which the catheter or tube conducting the steam lay, but diminished in thickness from the cervix upward, and within the uterus from the parts touched by the tube laterally, thus proving that the heated tube as well as the steam produced a cauterizing effect. The slough began to separate on the tenth day and came off on the fourteenth. The epithelium was regenerated by the end of a month. Follicular hyperplasia of the cervix was usually cured. The return of menstruation was somewhat delayed, but the function eventually became normal. The objections to the method, as far as determined, are that the cautery is not evenly distributed; the recovery requires a longer time than after curettage; uterine colic is occasionally produced; and in two cases among 12 the symptoms of parametritis developed during the second week. On the whole, therefore, the remedy can not be regarded as so safe and sure as others that are better understood.

Its application is quite simple. A tea-kettle is used having a spout connected with a catheter or uterine irrigator perforated at its end for seven cm. from it. The water is boiled in the kettle by means of a spirit lamp until the steam reaches a temperature between 105° and 115° C., and until the steam issues freely from the tube. The lamp is then removed, the tube cooled at the distal end, the lamp again put under the kettle, and the tube introduced. The distal end should lie for half a minute in one horn, and half a minute in the other, and be removed. An anesthetic is seldom required.

Schick obtained similar results by douching the uterine cavity with boiling water through a double irrigating tube attached to rubber tubing that siphoned water from a pan of boiling water. (Boiling water poured into a funnel attached to the tubing might act as well.) The boiling water should be allowed to run through the apparatus before it is introduced, in order to heat it and prevent too much cooling off. The irrigation should last from half to one minute and the vagina be protected by a simultaneous cold vaginal douche. The vaginal walls are held apart by retractors. Schick anesthetized the patient each time, and states that neither pain nor abnormal temperature followed.

13. If there be the remains of an old pelvic disease in the pelvis, an ice-bag should be kept on the lower abdomen for thirty-six hours, and pain be relieved by opiates. **Ice-bag.** **Opiates.**

After the first twenty-four hours the vagina should be douched out twice daily with the corrosive mercuric chlorid and plain douches, and the endometrium be let alone for four weeks. After that, local treatment may be commenced, or the case may be allowed to go without any local treatment, and report in another month to ascertain whether the inflammation is disappearing. Two and sometimes three curettings may be required. **After-treatment.** **Repeated curettages.**

The chief danger of the operation is sepsis from a want of perfectly aseptic conditions, or from the presence of a septic focus already in the pelvis. Laceration of the cervix or uterus from a too rapid and rough dilation increases the dangers by the addition of traumatism and the opening up of the avenue for the spread of infection to the surrounding connective tissue and peritoneum.

Astringent applications.

15. *Local treatment*, as recommended for chronic metritis, may be used for mild cases and for cases that are not completely cured by curettage (chap. IX, par. 15 and 16). Astringent applications, such as a 25 per cent. solution of chlorid of zinc, the solution of chlorid of iron, and ten per cent. solution of nitrate of silver, once a week, are to be preferred.

Removal of cause.

Displacements.

Inflammations.

Mechanical irritation.

Rest during menstrual period.

General treatment.

16. Success in the treatment depends largely upon a removal of the conditions that *cause* and *perpetuate* the disease. Retroversion, retroflexion, and prolapse of the uterus may need correction. Inflammation of the cervix, ovaries, or of the tissues surrounding the uterus, should be treated. The irritation of coitus, onanism, masturbation, lifting heavy objects, running sewing machines, skating, and the like, must be removed. During the menstrual period the patient should give up all regular occupation, and if there be menorrhagia or dysmenorrhea she should keep her bed. General tonics and hygienic regulations are also of great value in restoring these patients to health. Mild cases are sometimes cured without local treatment.

I usually recommend my patients to lie down two hours in the middle of the day, preferably before luncheon, and immediately after taking a hot douche. Massage and general faradization are prescribed for the worst cases. Others are encouraged to take systematic light exercise, such as the Swedish movements, half-pound dumb-bell or one-pound Indian club exercises, and short walks. These exercises are taken forenoon and afternoon, commencing with the slightest amount, and increasing it gradually and systematically. Many patients improve rapidly while taking the tincture of ferric chlorid with muriatic acid, or the protochlorid in pill form with strychnia. (See part I, chap. V, par. 14.)

CHAPTER IX.

CHRONIC METRITIS.

(*Chronic Interstitial Endometritis, Chronic Parenchymatous Metritis, Inflammatory Subinvolution, Chronic Septic Metritis.*)

Parts affected. Interglandular spaces. Glands.

1. **Pathological Anatomy.** Chronic metritis may be confined mainly to the mucous membrane or it may affect both the mucous membrane and the muscularis. The interglandular spaces of the *mucous membrane* are infiltrated with leukocytes and round cells, which compress the glands and cause their atrophy (Figs. 210, 211, and 213). In some cases the leukocytes penetrate the glands and destroy their epithelial structure (Fig. 216). In others, cyst formation due to stoppage of the glandular outlets, is noticeable. In cases of long duration the stroma cells of the mucous membrane are replaced by connective-tissue cells, and the muscularis is then covered by a thin layer of sclerosed

Epithelial structure. Cyst formation. Stroma cells. Muscularis.

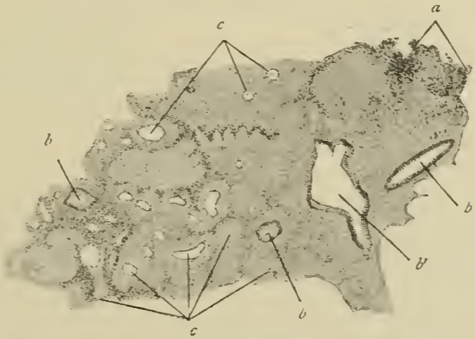


FIG. 210.—HORIZONTAL SECTION OF ENDOMETRIUM IN CHRONIC METRITIS. Leitz, Obj. 3. (*van Tussenbroek and Mendes de Leon.*)

a. Infiltrated portion. *b*. Cross-section of glands. *b*. Gland with epithelium partly destroyed. *c*. Lumina of blood-vessels, with hyaline degeneration of their walls.

Epithelium. connective tissue and scant epithelium without cilia, which may assume a squamous character toward or after the meno-

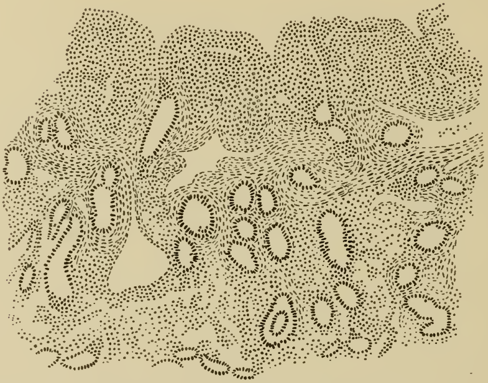


FIG. 211.—ACUTE AND CHRONIC METRITIS. (*Zweifel.*) × 50.

Grades. pause (endometritis atrophica). Different grades of inflammation may be found in different parts of the endometrium.

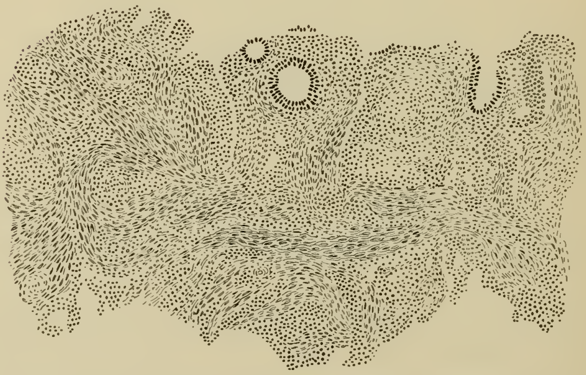


FIG. 212.—LATER STAGE OF CHRONIC METRITIS. (*Zweifel.*) × 70.

Decidua. When endometritis occurs after abortion, the decidua does not always undergo atrophy in all parts alike, and leaves small

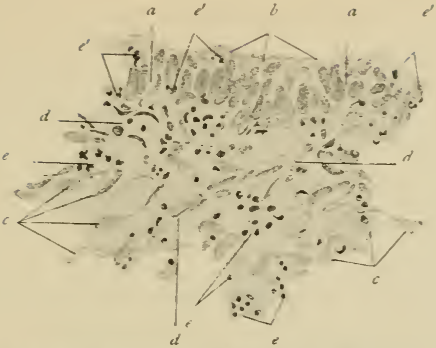


Fig. 213.—Uterine Mucous Membrane in First Stage of Metritis. Leitz, Obj. 7. (*van Tussenbroek and Mendes de Leon.*)

a. Surface epithelium. *b*. Cilia. *c* Stroma cells. *d*. Endothelial cells. *e*. Leukocytes. *e'*. Leukocytes on surface epithelium.

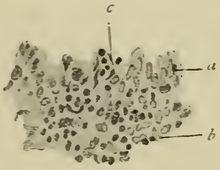


Fig. 214.—Uterine Mucous Membrane in Second Stage of Metritis. Leitz, Obj. 7. (*van Tussenbroek and Mendes de Leon.*)

a. Surface epithelium. *b*. Stroma with abundant infiltration of leukocytes. *c*. Leukocytes working through the epithelium to the surface.

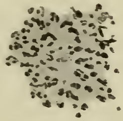


Fig. 215.—Uterine Mucous Membrane in Third Stage of Metritis. Leitz, Obj. 7. (*van Tussenbroek and Mendes de Leon*)

The underlying tissue is covered by leukocytes with fragmented nuclei; here and there are necrotic remains of stroma cells.

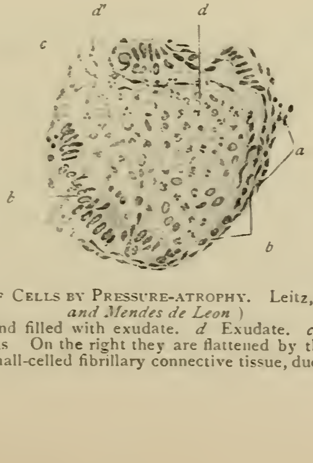


Fig. 216.—Destruction of Cells by Pressure-atrophy. Leitz, Obj. 7. (*van Tussenbroek and Mendes de Leon*)

Transverse section of a gland filled with exudate. *d* Exudate. *c*. Place of entrance of exudate. *b*. Epithelial cells On the right they are flattened by the pressure of the exudate. *a*. Stroma cells. *d'*. Small-celled fibrillary connective tissue, due to organization of exudate.

islands of decidual cells in addition to the small-cell infiltration about the glands.

Acute attacks.

In some cases the intensity of the inflammation is so great that an acute attack is practically lighted up at each menstrual period. The effusion of blood in the interglandular spaces at the period is so abundant that the superficial portion is loosened and thrown off, either in shreds or as a cast of the uterine cavity (exfoliative metritis). In addition to a crowding of the tissues with leukocytes, the stroma cells sometimes show an enlargement of their nuclei, and resemble decidua cells. (Fig. 219.)

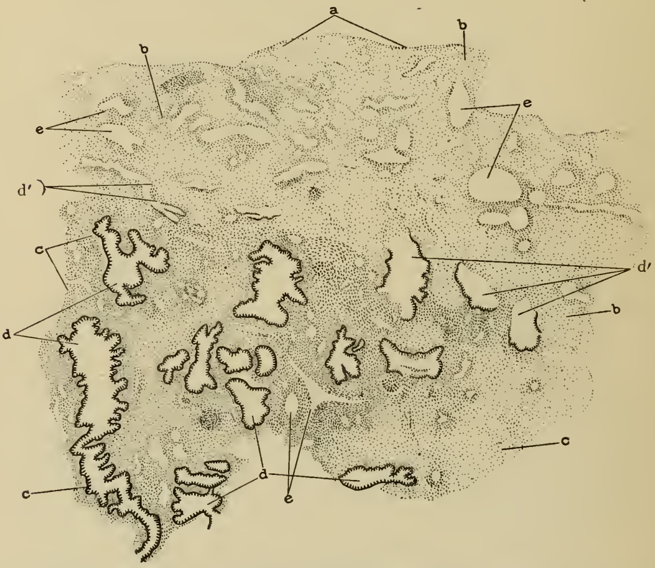


Fig. 217.—Vertical Section of the Uterine Mucous Membrane, the Upper Part of which Shows Inflammation; the Lower, Hyperplasia. Leitz, Obj. 3. (*van Tussenbroek and Mendes de Leon.*)

a. Mucous surface devoid of epithelium. b. Inflamed stroma. c. Normal stroma. d. Hypertrophied glands. d′. Hypertrophied glands at junction of inflammatory and hyperplastic layers.

Exfoliation.

Change in cells and nuclei.

Hyperemia, etc.

Embryonic elements.

2. The *uterine walls* are hyperemic and infiltrated to a variable extent, and a large number of embryonic ele-

ments are found in them (de Sinéty), particularly around the blood-vessels. In the later stages there is an increase of adult connective tissue between the muscular fibers and around the blood-vessels, which in time crowds the muscular tissue to such an extent as to cause its atrophy. It also encroaches upon the caliber of the blood-vessels, and, together with arthritis obliterans, leads to uterine anemia. The uterus becomes harder than natural, and for a long time remains enlarged, but may finally grow smaller than normal and undergo sclerosis.

Adult connective tissue.

Atrophy.

Anemia.

Size of uterus.

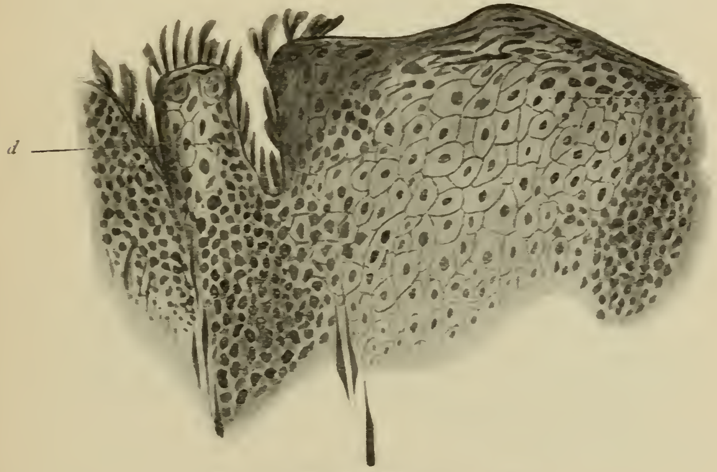


FIG. 218.—DECIDUAL METRITIS. (*Ruge.*)
d. Island of decidua.

In the senile state, stenosis of the internal os is apt to take place as a result of inflammatory thickening of the mucous membrane, or of atrophy of the cervix, or both. As a result of the repeated distention of the uterus with irritating fluid, and the vigorous contraction necessary for its evacuation, the uterine walls may become more or less hypertrophic. In a few cases, however, the walls become stretched and atrophic in character.

Stenosis.

Hypertrophic walls.

Atrophic.

Shape of cervix.

Mucous membrane.

3. The *cervix* is usually enlarged and thickened from coexisting cervical metritis, and may assume a truncated shape; or, if lacerated, is widely everted (chap. VII). The mucous membrane of the cervical cavity is at first hypertrophied, but later, as a result of maturing of inflammatory cells, is atrophied. It may consist of dense sclerotic tissue, or of old tissue with dilated blood-vessels. In some cases it is covered in part by squamous epithelium. The cervical discharge in such cases is serous or seropurulent. This is the condition often found in senile endometritis. Senile vaginitis and vulvitis are apt to complicate the latter condition.

Discharge.

Senile conditions.

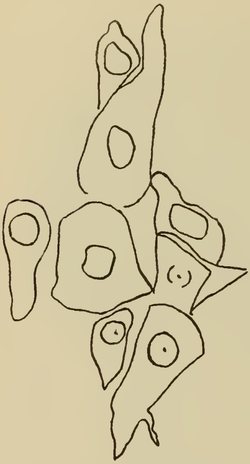


FIG. 219.—DECIDUA CELLS AT 600 DIAMETERS. (*E. Ries.*)

Disturbed involution.

4. In cases occurring after labor or abortion, the normal involution of the uterus, and to a certain extent of the other genital organs, is delayed or interrupted, and an *inflammatory subinvolution* results.

Comparison.

The condition is somewhat similar to that of *hyperplastic subinvolution* (chap. VIII, par. 2). The uterine and cervical walls are usually thicker, and the cervix and adnexa are apt to show signs of chronic inflammation.

Two causes.

5. **Etiology.** The causes of chronic metritis are: (*a*) acute metritis, and (*b*) infection.

Imperfectly cured puerperal metritis.

Acute metritis after labor or abortion, if imperfectly cured, is followed by chronic inflammation of the endometrium and uterine walls, and usually by inflammatory subinvolution.

Instruments, etc.

Infection of the endometrium by means of unclean instruments or other foreign bodies may give rise to a chronic inflammation without any noticeable acute attack, or produce an acute attack that may initiate the chronic inflammation.

From cervix.

Or an inflammation of the cervix may spread to the endometrium.

The traumatism resulting from gynecological examinations and manipulations increases the liability to chronic inflammation of both the endometrium and uterine walls. Stenosis of the cervix, by interfering with uterine drainage, predisposes to it, and, if inflammation be present, aggravates it.

Symptoms of hyperplasia.

6. **Symptoms.** There are few characteristic symptoms of metritis that do not also belong to hyperplasia of the endometrium, and many of the symptoms present are due to complicating inflammation of the adnexa. Hence we will lay stress upon those symptoms which are characteristic, and refer the reader for the descriptions of the symptoms to those parts of the book in which they are found.

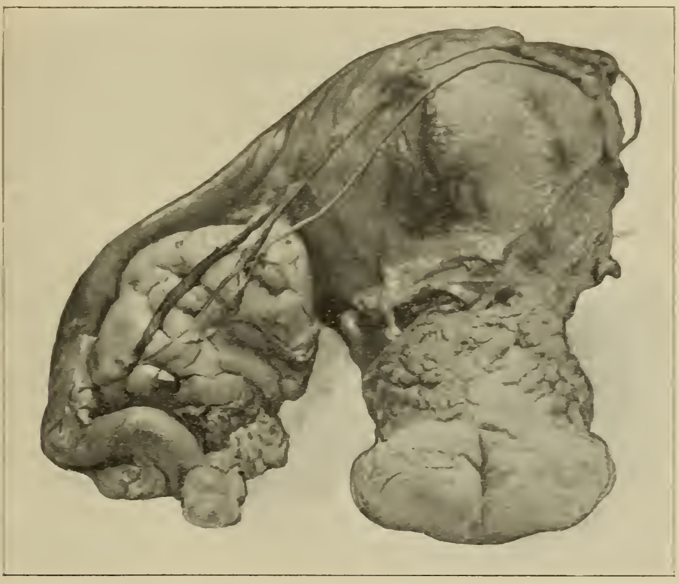


FIG. 220.—UTERUS ENLARGED FROM CHRONIC METRITIS. (*From photograph of Author's Case.*)

Removed by vaginal section, with enlarged ovary and tube. A few of the bands of adhesions are still seen passing from the uterus to the ovary.

In early stage.

7. *Leukorrhea* is nearly always present until an advanced

Advanced stage. Sclerosis.

stage of the disease, when it often becomes so slight that it scarcely attracts the patient's attention, and after sclerosis of the mucous membrane has resulted is absent altogether. The discharge is at first mucopurulent or purulent, but later may become seropurulent, particularly after the menopause. If, in the latter class of cases, cervical stenosis supervenes, the discharge may become decidedly purulent, offensive, and irritating, and gives rise to or perpetuates a senile vaginitis and vulvitis.

Character of discharge.

Effect of stenosis.

Amount.

8. *Menstruation* may be increased somewhat in the earlier stages, but in long-continued inflammation it becomes scanty. Dysmenorrhea of an aching or throbbing character, lasting during a part or all of the period or even beyond it, is a prominent symptom in a few cases (see part III, chap. IV, par. 8 and 19. Inflammatory and membranous dysmenorrhea). When it exists in connection with retroflexion or retroversion, it partakes of the mechanical or colicky variety, the pain lasting throughout the period (part IV, chap. IV, par. 13).

Inflammatory.

Mechanical.

9. The *pains* of metritis are similar to those of uterine hyperplasia (chap. VIII, par. 7). Backache and bearing-down sensations are prominent, but the surrounding inflammation in the pelvis is apt to bring other pains into the foreground (chap. X, par. 16). The pelvic discomfort is usually worse in the latter part of the day if the patient is on her feet much of the time.

Hyperplasia. Character of pain.

Made worse.

Uterine colic between the menstrual periods, due to an accumulation of mucus in the uterus, and relieved by its expulsion, has been observed. In some cases one severe attack of this kind will occur half way between the menses. It is called "intermenstrual pain," and is supposed by many authors to depend upon accumulations in the Fallopian tube.

10. The *general* and *reflex* symptoms are the same as those already described in connection with uterine hyperplasia (chap. VIII, par. 6 and 7).

Hyperplasia.

Retention of pus in senile cases gives rise to the symptoms of sepsis, which are prominent when the uterus is full of pus and may be absent after its periodic expulsion. The condition is liable to be mistaken for malignant disease, with which it is sometimes associated.

Sepsis.

Malignancy.

Sterility is the rule in all but the mildest forms, yet some portions of the endometrium may be sufficiently normal to receive the ovum (see par. 13).

Frequency.

11. **Physical Signs.** The physical signs of hyperplasia (chap. VIII, par. 9) are usually present, but the uterus is apt to be a little larger and harder, except in the earlier stages, and the cervix is more often thickened and of a dusky red or purplish color. Or the cervix may be affected with follicular inflammation or hyperplasia, and give exit to an abundance of tenacious mucus.

Hyperplasia.

Size of uterus.

Cervix.

Follicular cervicitis.

When enlarged the uterus lies low in the pelvis, unless held up by adhesions in connection with inflammation of the adnexa. In the latter case the symptoms are more pronounced than in the former. Many times distinct enlargement of the adherent appendages can be felt, or a pyosalpinx or ovarian abscess may be so extensively adherent to the enlarged rounded uterus that the whole mass resembles a uterus with mural or subperitoneal fibroids (chap. XI, par. 2).

Position of uterus.

Adhesions.

Appendages.

12. **Diagnosis.** Chronic metritis is distinguished from hyperplasia by the purulent or viscid character of the discharge, tenderness of the uterus, the purplish or dark red color of the cervix, thickening and follicular disease of the cervix, and the signs of parametritis or disease of the adnexa. Metritis is usually preceded by an acute attack, or an abortion, or a difficult labor, while hyperplasia, excepting subinvolution, is apt to occur in nulliparæ who have never had a pronounced acute attack, or to date back beyond their first pregnancy.

Discharge.

Tenderness.

Cervix.

Adnexa.

Antecedents.

Not all these distinctions are present in each case, for the discharge may have become clear, the cervix may have re-

Absence of distinctions.

covered to a great extent and be normal in color, and the surrounding inflammation may have almost disappeared. In many cases it is complicated by hyperplasia. Complication.

Endometritis in the aged, with stenosis of the cervix and retention of pus (senile endometritis), may be distinguished from carcinoma by its chronicity, the variability of the septic symptoms, the absence of metrorrhagia or the characteristic bloody water and dish-water discharges, by the flabbiness of the uterus, and by the relief of symptoms after the pus has been let out through the dilated cervix. From carcinoma. Chronicity. Variability. Discharges. Flabbiness. Relief.

Early pregnancy may be mistaken for metritis complicated by subinvolution. In pregnancy the uterine body is softer, less tender, and after the eighth week bulges more distinctly. The cervix is not so much enlarged, is relaxed, and decidedly softened deep into its substance. The vagina and hymenal area, as well as the cervix, are of a purplish color. Symptoms of pregnancy are seldom wanting. Pregnancy existing at the same time with enlarged diseased cervix makes the differentiation more difficult.

13. **Prognosis.** When discovered early and properly treated, recovery is often possible. When the disease has lasted for some time and the adnexa are not extensively affected, a cure may still be hoped for in case there is not much parenchymatous inflammation. When the uterus is much enlarged and there is the remains of pelvic peritonitis, the prognosis is unfavorable. However, if the endometrium has been properly treated, the effect of the menopause, together with the tendency to sclerosis, may diminish the congestion and reduce the uterus until it becomes approximately normal in size and the symptoms disappear. Recovery. Old cases. Enlarged uterus. Menopause. Symptoms disappear.

Permanent sterility is the rule in severe cases. When impregnation takes place there is a liability to disease of the ovum and abortion, or to adhesion of the placenta at the time of labor. As a result, an acute attack of metritis or of hyperplastic subinvolution may complicate the former trouble. The rule. Abortion. Adhesion of placenta. Complication.

Prophylactic.

14. **Treatment.** The prevention of infection during and after labor, abortion, and operations, and the cure of acute inflammation of the uterus (chap. VI) are of the utmost importance as preventives of this intractable disease.

Displacement. Coitus. Menses. Habits, etc. Scarification. Tampons. Douches.

In the *earlier stages* uterine displacement is to be corrected, coitus restricted, the patient kept in bed during the menstrual period, and her daily habits and mode of life regulated in the manner recommended for hyperplasia (chap. VIII, par. 15). The cervix should be scarified two or three times weekly, and glycerin wool tampons be applied each time, leaving them from one morning until the evening of the next day. Hot vaginal douches (part I, chap. V, par. I) taken upon retiring for the night, and in the forenoon at a time when the patient can lie down for an hour or two, act beneficially.

The same treatment is indicated for advanced cases connected with inflammation of the adnexa and pelvic peritoneum. When scarifying the cervix it is sufficient to allow from one to two teaspoonfuls of blood to flow each time. By leaving the tampons from the forenoon of one day until the evening of the next, the pelvic organs are supported for two days, although the tampons are in the vagina less than thirty-six hours.

Drainage. Sound. Stimulates circulation. Slippery-elm tent.

15. In the more *chronic cases* the first thing to do is to secure uterine drainage. If the cervix is too small, or is contracted at either the internal or external os, it is advisable to pass a large sound or bougie before making each application to the endometrium (Fig. 21). This not only drains the uterine cavity, but it stimulates the circulation of the cervix and lower uterine segment. If the cervix is very small, and a flexible bougie or sound can not be passed without causing too much pain, a small conical tent can be whittled out of a thick piece of slippery-elm bark and used as a dilator for two or three times, or until the sound can be substituted (Fig. 47).

The strictest antiseptic precautions must be observed in sounding or probing the uterus, for the uterine cavity is normally free from pathogenic germs, and the introduction of such germs into it will invariably add to the disease and frustrate all attempts at a cure. The patient should take a vaginal douche before coming to the office. The surgeon should wipe out the vaginal fornices and cervix through the sterilized speculum with sterilized absorbent cotton, and then swab out the parts repeatedly with a five per cent. aqueous solution of carbolic acid. Then a sterilized sound should be dipped in the five per cent. carbolic solution and introduced to the fundus without touching anything on its way to the cervix. After this the uterine cavity is swabbed out with the five per cent. carbolic solution, if the application to be used for the inflammation be not a reliable antiseptic. The size of the sound should be steadily increased until one as thick as a lead pencil can be passed.

The slippery-elm tent (part I, chap. IV, par. 14) is dipped for a few seconds in the five per cent. solution, then pinched between the teeth of the sterilized dressing forceps to render it flexible, then bent as much as may be desired, then dipped again in the solution, and introduced and left for two or three minutes. It can be followed by a larger one on the same occasion, as its use is not so painful as that of the sound.

Mild applications.

Stronger.

Contra-indication.

16. Until the cervix will allow a No. 12 or 14 sound (American scale) to pass easily, and without causing blood to appear, a mild application, such as a 25 per cent. solution of ichthyol in glycerin, should be applied three times weekly to the endometrium by means of an applicator, wound with cotton and well saturated. When the sound passes easily and with but little pain, stronger applications, such as the tincture of ferric chlorid, tincture of iodin, or a mixture of equal parts of tincture of iodin and carbolic acid, or of carbolic acid and glycerin, may be used. If there be a salpingitis or pelvic peritonitis, local stimulating applications are contraindicated.

Tolerance to strong applications.

If the uterus is, or becomes, tolerant of strong solutions, the strong carbolic acid, or strong solution of ferric chlorid, or a 30 per cent. solution of zinc chlorid in water may be substituted for the milder applications every second or third time.

Pozzi prefers injecting about three gm. (ʒ¾) of the solution into the uterus with Braun's intra-uterine syringe. It should not be more than half as strong as those used on the applicator. I can only recommend the method for hospital practice, and through a well-dilated cervix. Severe pain sometimes follows the injection of strong solutions.

In using tampons, I prefer to apply a small cotton tampon, saturated in glycerin, under the cervix, and another tampon of dry wool under it, made very soft and large enough to fill the vagina loosely. A thread should be tied to each to facilitate their removal.

For office treatment, the dorsal recumbent posture, with a bivalve speculum, is most convenient. In hospital practice, Sims' position is preferable, as it enables us to fill the vagina more evenly.

Intra-uterine pencils, or suppositories of cacao butter or gelatin, containing iodoform, ichthyol, iodol, salicylic acid, thymol, etc., are sometimes used, but they are less reliable in their action than the solutions, and are apt, like the intra-uterine injections, to cause painful uterine contractions. When not too strong, however, containing from five to 20 per cent. of the drug only, one may be used after each treatment to prolong the aseptic condition of the endometrium.

Intra-uterine douches of weak antiseptic or astringent solutions, such as two per cent. solutions of carbolic acid or lysol, or a 1 : 2000 solution of potassium permanganate or corrosive mercuric chlorid, used twice daily, through the dilated cervix, is the best treatment for cases due to recent infection; and even in old cases in which there is a septic discharge they are beneficial after the curetting, or in connection with other intra-uterine applications.

17. The treatment of endometritis with *stenosis* and retention of pus should be similar to that of any pus cavity. Drainage must be provided for by keeping the cervix well dilated, and by washing out the uterus with antiseptic and stimulating solutions. The cavity can neither be obliterated nor rendered normal by strong applications, hence these should be reserved until the uterine cavity has gradually contracted to normal dimensions. After that the zinc chlorid and iron solutions mentioned in paragraph 16 should be used. The recovery is apt to be a slow one.

Pus cavity.
Drainage.
Uterine lavage.
Strong applications.
Slow.

18. In *endometritis*, or those cases limited mostly to the mucous membrane, and which have not lasted too long, as well as those cases in which there is *menorrhagia* due to accompanying glandular hyperplasia, curettage is indicated (chap. VIII, par. 12). The same success can not, however, be expected as for hyperplasia, for the interstitial inflammation

Curettage.
Imperfect action.

Infected tissue. Sharp curette. Strong application. After treatment.

affects the tissues around and even under the glands, and the infected tissues can not all be removed without destroying the mucous membrane. In such cases the sharp curette should be gently used, and a penetrating disinfectant and astringent be applied after it, such as the strong solution of iron or a 30 per cent. solution of zinc chlorid. Subsequent treatment as recommended in paragraphs 15 and 16 should follow the operation.

CHAPTER X.

SALPINGITIS AND ITS COMPLICATIONS.

PELVIC PERITONITIS. ABSCESS OF THE OVARY.

1. **Classification.** Salpingitis and its results may be classified as follows :

- Catarrhal, Purulent, and Interstitial Salpingitis.
- Cystic conditions of Tube and Ovary.
  - Pyosalpinx, or Sactosalpinx purulenta.
  - Hydrosalpinx, or Sactosalpinx serosa.
  - Hematosalpinx, or Sactosalpinx hemorrhagica.
  - Tubo-ovarian abscess.
  - Tubo-ovarian cyst.
  - Ovarian abscess.
- Atrophy of the tube.

Unilateral. Size and shape. Wall.

2. **Pathology.** *Catarrhal salpingitis* is generally unilateral, and accompanied by more or less general enlargement of the tube, up to the size of the thumb, as well as by a slight increase in its tortuosity. The entire wall is thickened, softened, and injected, but much more so in the mucous folds and

their connective-tissue framework, which is infiltrated with round cells. The ostium abdominale at first may be patulous, but as the infiltration under the serous coat increases the latter extends over the fimbriæ to a variable extent, and either contracts upon them or extends over them and covers them up.

Ostium abdominale.

The folds of mucous membrane are swollen, and secondary ones are developed on their sides, packing the tube closely. They are agglutinated in places, inclosing spaces among them and giving the appearance of glandular formation. The epithelium as a rule retains its integrity, but both the cells and nuclei are somewhat enlarged.

Mucous folds.

Agglutination.

Epithelium.

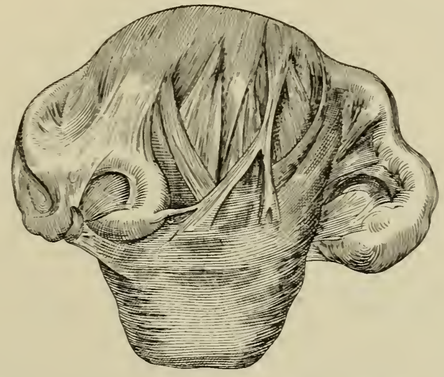


Fig. 221.—Salpingitis with Pelvic Peritonitis and Adhesions Posterior to the Uterus. (*Heitzmann.*)

The mucous membrane is moistened with a mucous secretion which may be thin and clear or viscid and of a whitish or reddish color. It contains degenerated epithelial cells, leukocytes, and sometimes blood-corpuscles.

Secretion.

Contents

In most cases a few drops of mucus escape through the abdominal ostium and cause a localized evanescent peritonitis, with slight effusion and temporary frail adhesions. These discharges into the peritoneal cavity may take place many times, giving rise to recurrent attacks of pelvic peritonitis, or they

Peritonitis.

Adhesions.

Recurrent attacks.

Hydro-salpinx. Microbes.

may lead to a closure of the abdominal opening and hydrosalpinx (par. 7). Microbes are undoubtedly present, but they have not as yet been isolated and studied.

Walls. Compartments.

3. In *purulent salpingitis* the walls of the tube are more extensively infiltrated, and its course, in advanced cases, is often so tortuous as almost to divide it into compartments.

Secretions. Mucous folds. Lymphatics. Epithelial cells. False membrane. Serous surface.

The mucous membrane is bathed in pus or a mucopus of variable density and color. Its folds are swollen and exceedingly vascular. The lymphatics about them are enlarged and filled with leukocytes and connective tissue infiltrated with round cells. The epithelial cells are enlarged, and compressed out of shape, and lose their ciliæ. In the worst cases a superficial necrosis, with formation of a false membrane, takes place. As a rule some exudate appears on the serous surface, forming adhesions with the surrounding surfaces.

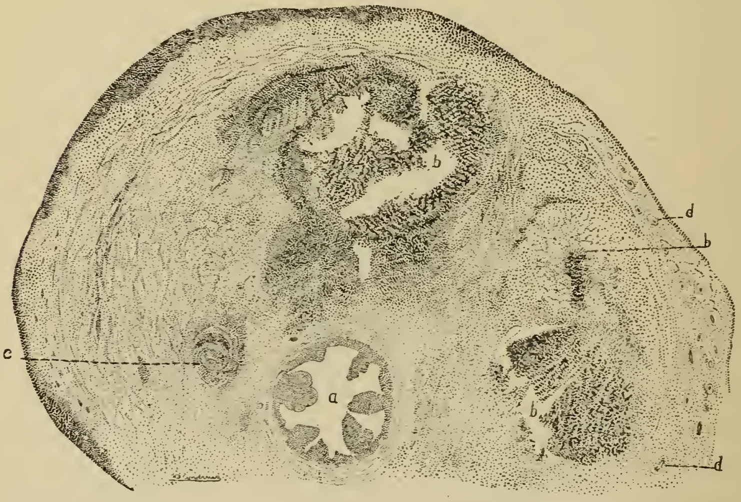


Fig. 222.—Cross-section of Tube Affected with Suppurative Inflammation. 1 : 26
(*Prepared by Evans from Author's Case.*)
a. Lumen of Tube. *b, b, b.* Foci of pus in tubal wall. *c.* Foci of degeneration of same nature. *d, d.* Blood-vessels of mesosalpinx.

The infection may travel along the lymphatics, and foci of suppuration be found in the tube wall some distance from the lumen (Fig. 222). In such cases the epithelium participates to a less degree. A localized peritonitis, due to the dripping of pus from the abdominal end (Tait), attaches the fimbriæ and ostium to the ovary and posterior surface of the broad ligament. In some cases the swollen serous and muscular coats sooner or later extend entirely beyond the fimbriæ, and the ostium is closed over them, so that, if not destroyed, they lie folded up within, and are invisible when the tube is exposed to view. The uterine orifice is tightly filled by the swollen folds of mucous membrane, but is not impermeable.

Abscess in wall.
Peritonitis.
Closure of ostium. abdominale.
Uterine orifice.

In the beginning the disease is usually confined to one side, but is apt, after a time, to affect the other. The peritonitis, owing to repeated escapes of pus from the tube, may extend to the entire pelvic cavity, agglutinating the pelvic organs, omentum, or even the intestines, and infiltrating the connective tissue quite generally. Accumulations of pus or serum between the adhesions are occasionally found, sometimes displacing the uterus laterally or forward. Excluding the gonococcus (chap. xv), the streptococcus is the most common germ found. Occasionally the staphylococcus, the pneumococcus, the bacillus coli communis, the bacillus of syphilis, and other rare varieties are present.

Unilateral.
Extent of inflammation.
Accumulations.
Germs.

5. *Interstitial salpingitis* represents an advanced stage of catarrhal or purulent salpingitis, or an invasion of the tubal walls by germs, usually streptococci, from the surrounding tissues, and usually both sides are affected. The walls of the tubes are thickened, hardened, and purplish in color (Fig. 223). Sometimes the induration is general, and sometimes it is more marked in places, giving a nodular character to the tube. The ostium abdominale is nearly always closed, but the uterine orifice is more or less pervious. A small amount of mucopus is usually found in the tube. The mesosalpinx

Definition.
Both sides.
Walls.
Nodular.
Orifices.
Contents.
Mesosalpinx.

may be expanded by the enlarged tube, or it may be held folded upon itself by adhesions, or it may be extensively infiltrated by inflammatory products (Bland-Sutton, see chap. XII, **Adherent.** par. 2, Fig. 232). The tube and the ovary are adherent on the posterior surface of the broad ligament over or beside the sacro-uterine ligament, or in the culdesac of Douglas.

Adhesions. The peritoneal adhesions which may involve the omentum **Firmness.** and intestines are usually organized, and so firm in some cases that they can not be broken up without laceration of the peritoneal surfaces, or even walls, of the viscera. Organ- **Bands.** ized bands may extend between the surfaces in all directions, **Difficulty.** and it is sometimes difficult, when the abdomen is opened, to determine the relation of the parts of the tumor-like mass thus formed.

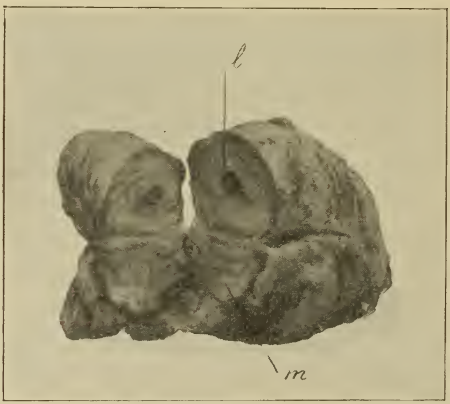


FIG. 223.—INTERSTITIAL AND PURULENT SALPINGITIS. (*Author's Case.*)
l. Lumen of tube. *m.* Mesosalpinx.

Mucous membrane. The mucous membrane is dark blue in color, the epithelial cells are flattened and cubical in places and extensively destroyed, while the villi are enlarged, agglutinated, and partly destroyed by small-cell infiltration. False glands and cystic **False glands, etc.** spaces are thus produced at some distance below the surface, and partial occlusion of the lumen of the tube may occur at one or more points.

Walls.

Nodular form.

Blood-vessels, etc.

Torsion and gangrene.

The muscular tissue of the walls is thickened by an extension of muscular fibers and connective-tissue cells, which may accumulate around newly formed cysts, or pseudocysts, of the mucous membrane and give rise to the nodular form of salpingitis. These nodules are usually found near the uterine end (salpingitis isthmica nodosa. Chiari). The blood-vessels are enlarged and invaded by streptococci, and extravasations of blood are numerous and often extensive. There may be a twisting of the tube and interference with its return circulation, causing an enlargement, and sometimes a disorganization of its elements that simulates gangrene. The infiltration and disorganization of the vessel walls are pronounced.

Definition.

Closure of tube.

Escape into uterus.

6. *Pyosalpinx* signifies an accumulation of pus in a closed or cystic Fallopian tube. It is an advanced stage of purulent and interstitial salpingitis in which the abdominal opening is obliterated by inflammation and the uterine opening practically closed by the extreme torsion of the tube or by inflammatory thickening of the walls. As a result of the pressure of the accumulated fluid, some of it may, however, occasionally escape into the uterus.

Contents.

Accumulation.

Size.

Walls.

The pus may be mixed with blood, serum, or mucus, and may be of a thin, or of a more or less cheesy, consistence. Fibrinous shreds, degenerated epithelial cells, and granular detritis are found in it. The accumulation is usually in the ampulla, giving the tube the shape of a gourd or pear (Fig. 224); but it may occur as two or three separated collections in different portions; or it may distend almost the entire tube, giving it a sausage shape. The size of the cyst varies from slightly above normal to that of a child's head, but is seldom more than five cm. (two inches) in diameter. The walls about the inclosed fluid, although variable, are thinner and more friable than in interstitial salpingitis, and are more liable to rupture, particularly on the posterior surface. The musculature is atrophic. Mucous membrane. The mucous membrane presents changes similar to those of septic salpingitis, but in old cases is more or less atrophic.

Peritoneum, etc. The adhesions and changes in the pelvic peritoneum are similar to those of interstitial salpingitis, as are also the changes in the walls of the uterine end or isthmus. Isthmus. Acute attacks of peritonitis due to traumatism, as well as secondary Peritonitis. infection through intestinal adhesions, are common, adding fresh exudate each time.

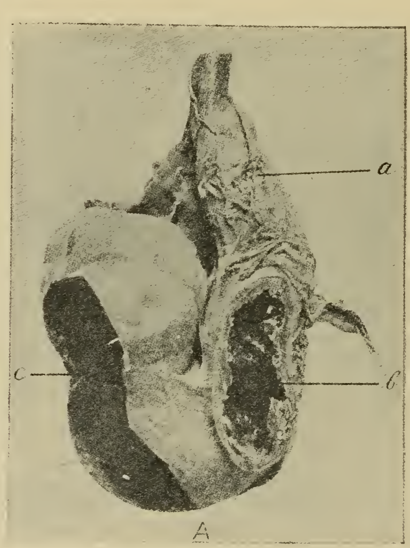


FIG. 224.—PYOSALPINX. (*Freeborn.*)
A. Left tube. *a.* Uterine end of tube covered with adhesions. *b.* Longitudinal section of the tube at its middle portion. *c.* Cyst of the fimbriated end.

Pus. The pus is sterile in more than one-half of the cases. The germs, when present, are the same as those of purulent salpingitis.

Rupture into rectum and bladder. Rupture of the tube into the rectum is a frequent occurrence. Rupture into the bladder may also take place. In some instances the distended tube separates the layers of the mesosalpinx, and is partly surrounded by the pelvic connective tissue, and may then rupture into the broad ligament and give rise to a pelvic cellular abscess, which in turn may rupture into the vagina or rectum. Rupture into the peritoneal cavity occurs very rarely, on account of the adhesions. Nearly all the escapes of pus into the peritoneal cavity are through the ostium abdominale from non-cystic tubes.

Abscess.

Peritoneal cavity.

From ostium abdominale.

7. *Hydrosalpinx* may result from a closure of the abdominal ostium in a case of catarrhal salpingitis, or it may be an advanced stage of pyosalpinx. The adhesions as a rule are in part absorbed and drawn into membranous shreds, the tubal walls are attenuated and translucent, the mucous membrane atrophied, and the epithelial cells flattened. The germs in the pus have become destroyed, and the pus has been replaced by a serous fluid which contains epithelial cells, leukocytes, and sometimes blood-corpuscles. The size and shape vary within wide limits. Axial rotation, or a twisting of the undilated portion of the tube on the long axis, with effusion of venous blood within the cyst, giving the fluid a chocolate color, has been noticed in some instances.

Origin.

Changes.

Germs.

Fluid.

Size and shape.

Rotation.

Venous effusion.

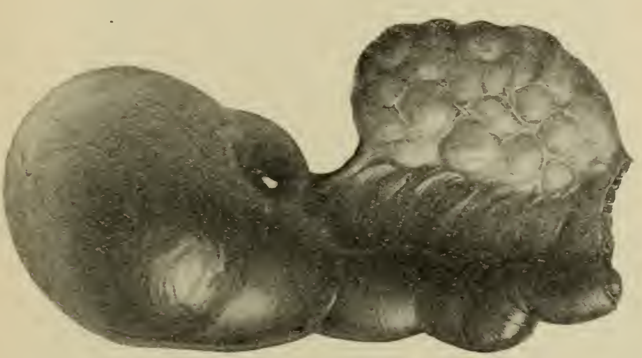


Fig. 225.—Hydrosalpinx without Adhesions The Opposite Tube and Ovary were Densely Matted Together. (*Cullen.*)

The change of pelvic pus into serum was described and demonstrated by Wm. H. Byford (" Transactions of American Gynecological Society," 1883). From his observations and those of Bixby (*ibid.*, 1877) it would seem probable that hematosalpinx may also be converted into hydrosalpinx. In some cases of hydrosalpinx a small collection of pus is found nearer the uterus, or pyosalpinx is found near the uterus and hydrosalpinx at the other end.

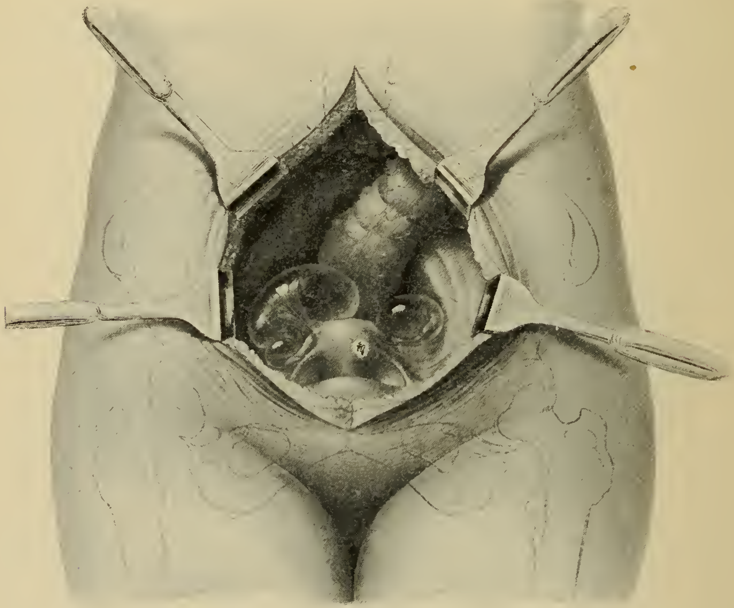


FIG. 226.—DOUBLE HYDROSALPINX. (*Cullen.*)

Shows the uterus with a dilated and convoluted Fallopian tube on either side. The tubes are translucent, pass outward, then backward and inward, terminating in Douglas' culdesac.

Broad adhesions are seen stretching across from the right tube to the uterus. The same condition is present on the left side, but it is impossible to see them when this view of the pelvis is taken.

In front of the uterine attachments of the tubes the round ligaments are seen passing downward and outward. Anterior to the uterus is the contracted bladder, posterior to it the rectum.

The author observed a case of double hydrosalpinx the size of a small adult head and of a cocoanut, respectively, as the result of obstruction of the uterine openings in a case of cystic uterine fibroid. The tubal walls were hypertrophied instead of attenuated.

Hydrosalpinx is said to be intermittent when the contents occasionally escape through the uterus, and the tube afterward refills.

8. *Hematosalpinx* may be divided into two kinds, the spurious and the true.

Spurious hematosalpinx is an effusion of blood into the normal or inflamed tube during menstruation or catarrhal inflammation, or as the result of mechanical interference with the tubal circulation by pelvic exudates, displacement of the tube, etc. The blood escapes into the uterus or is absorbed, or may flow into the abdominal cavity and produce a pelvic hematocele.

Effusion of blood, etc.

Causes.

Blood escapes.

True hematosalpinx consists of an accumulation of blood in a *cystic* tube, and thus almost always follows a pyosalpinx or a hydrosalpinx, as a result of traumatism, twisting of pedicle (Veit), etc. If the proportion of blood is small, it remains fluid; if large, it may coagulate and undergo more or less organization, or become thick and tarry, and in some instances may possess septic qualities. The walls of the tube resemble those of pyosalpinx, or, occasionally, those of hydrosalpinx. A true hematosalpinx is sometimes observed in connection with uterine fibroids.

Accumulation in cystic tube.

Follows pyosalpinx, etc.

Contents.

Walls.

Fibroids.

A mere coloring of the pus or serum of pyo- and hydrosalpinx does not constitute hematosalpinx. A tubal pregnancy does not produce a hematosalpinx unless the ostium abdominale becomes occluded. A resumption of activity of septic germs, or a reinfection, may reconvert a hematosalpinx into a pyosalpinx. Retention of menstrual fluid in a tube, due to genital atresia, will be considered as merely a part of hematometra and not as a true hematosalpinx.

9. A *tubo-ovarian abscess* is a pyosalpinx communicating with an abscess of the ovary. An ovarian abscess or cyst lies in contact with a pyosalpinx, and ulceration and perforation take place in the adherent walls between them. Or a tubo-ovarian abscess may be formed by an adhesion of the fimbriæ of a suppurating tube to the ovary, the latter becoming part of the wall of the resulting pyosalpinx. The ovary becomes infected (par. 11), and secondary ovarian abscesses may form

Definition.

Ulceration between walls.

Adhesion of fimbriæ.

Infection of ovary.

which destroy the ovary and rupture into the main cavity. The fimbriæ form a part of the lining of the ovarian portion.

From hydrosalpinx, etc. 10. A *tubo-ovarian cyst* is a hydrosalpinx connected by a free opening with a cystic ovary or ovarian cystoma. Usually the ovary is entirely converted into a cyst. The condition From tubo-ovarian abscess. may be the final result of a tubo-ovarian abscess. The general Appearance, etc. appearance and pathological conditions are similar to those of hydrosalpinx.

When the communication between the cysts is through the ostium abdominale, Bland Sutton, basing his views upon Arthur Robinson's investigations of the ovaries of animals, calls it ovarian hydrocele, the walls of the ovarian portion being made up of a peritoneal sac derived from the broad ligament, and which contains or involves the ovary. A tube is supposed in some cases to project into a ruptured ovarian cystoma and to form part of its cavity. I should say that the presence of the fimbriæ in the cavity of the ovarian portion were better accounted for by the conversion of the second variety of tubo-ovarian abscess mentioned above (par. 9) into a tubo-ovarian cyst.

Frequency. 11. *Pathological changes in the ovary* are such constant and important concomitants of all forms of salpingitis as to require special mention.

Tunica albuginea. As a result of inflammation, the tunica albuginea becomes thickened and sclerotic, preventing the rupture of the ovaries Ovisacs. and the full development of the ovules. The ovisacs are represented by small serous cysts, some of which may coalesce and form larger ones, and even the ovules themselves may Ovary. become dropsical (cystic ovaritis). The ovary may be more Cysts. or less filled with these cysts, or it may be considerably en- Interstitial inflammation. larged by a preponderance of interstitial inflammation, with proliferation of connective tissue and atrophy of the glandular Blood in cysts. portion. Effusion of blood into one or more of the cysts occurs, distending them with a thick, bloody fluid, or forming Clots. in them organized blood clots from the size of a mustard seed to that of a hen's egg. A jagged, yellowish, fibrous wall Fibrinous wall. forms around the larger clots, and may remain as a collapsed corrugated membrane after the blood clot has become absorbed. Minute interstitial hemorrhages about the blood-vessels are often found (Figs. 227, 228, and 236).

Interstitial hemorrhages.

Purulent infection of the ovisacs sometimes takes place, either as a result of escape of pus from the ostium abdominale or from the adhesion of a pyosalpinx to the ovary, or from the transmission of germs from the tubal or uterine walls along the lymphatics. Some of the cysts in the ovary become infected, and these in turn affect other cysts, many of which coalesce and form an ovarian abscess of varying size.

Escape of pus.
Adhesion.
Lymphatics.
Infection of cysts.

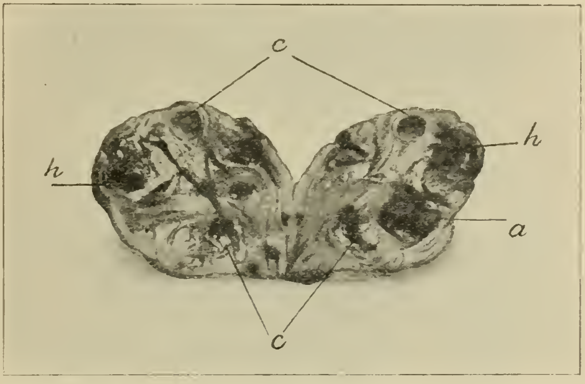


Fig. 227.—Changes in Ovary due to Peripheral Oophoritis. Ovary Laid Open. (*Author's Case, same ovary as in Fig. 224.*)

c, c. Corpora lutea from which clotted blood has been removed. *a.* Follicular cyst. *h.* Interstitial hemorrhage with intense congestion near it.

In some cases the tubal inflammation subsides and almost disappears, while the ovarian suppuration continues. The pus may go on invading new areas until the entire ovary is converted into a pus sac surrounded by adhesions, and may then discharge into the rectum, vagina, connective tissue, or peritoneal cavity. In many cases the pus loses its virulence and remains encysted throughout the lifetime of the patient, ever ready, however, to reassume septic qualities upon the occurrence of an adequate exciting cause.

Progress.
Pus sac.
Discharge.
Encysted pus.
Danger.

Cause. Rupture. Cicatricial contraction.

12. *Atrophy* of the tube may result from the destructive action of pelvic suppuration. After the partial atrophy of the walls by cystic degeneration, a rupture and discharge of the contents may be followed by cicatricial contraction and partial obliteration. Traces of mucous membrane and muscular fibers may be left, but the main part consists of connective tissue that has contracted to such an extent as to resemble a fibrous cord.

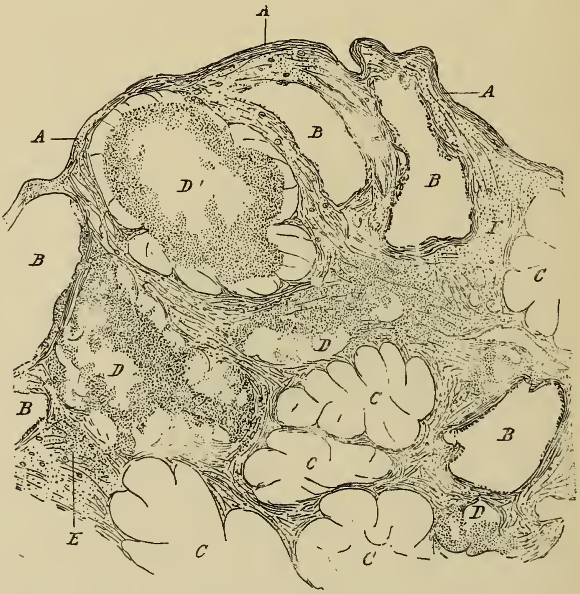


FIG. 228.—CHRONIC OOPHORITIS OF PERIPHERAL ORIGIN. 30 diameters. (*Petit and Bonnet.*) *A, A.* Sclerosis of the tunica albuginea *B, B.* Follicular cysts. *C, C.* Corpora lutea undergoing hyaline degeneration. *D, D.* Same invaded by hemorrhage. *D'.* Corpus luteum transformed into a blood cyst. *E.* Interstitial hemorrhages. *F.* Connective tissue undergoing sclerosis.

According to Boldt, atrophy of the tube may result from interstitial salpingitis without cystic degeneration. (*Am. Jour. of Obst.*, 1888.)

13. **Etiology.** Catching cold, excessive coitus during menstruation, traumatism connected with operations, sounding of

the uterus, intra-uterine applications, labor, and abortion produce tubal congestion and hypersecretion, or effusion of blood into the tube. These conditions favor the spread of infection from the endometrium along the mucous membrane, or, by way of the lymphatics and connective-tissue cells, from the injured mucous membrane or walls of the uterus or vaginal fornices.

Eruptive fevers and syphilis may be mentioned as occasional causes. Papilloma, tuberculosis, and cancer may also act as such, but these conditions will be discussed elsewhere.

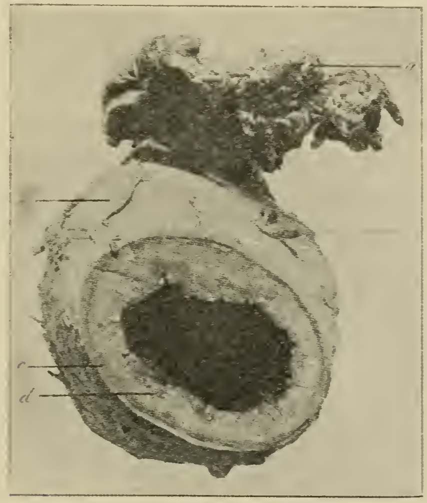


Fig. 229.—Suppurating Cyst of the Ovary and Suppurating Salpingitis. (*Freeborn.*) *a*. Enlarged and tortuous tube, its surface covered with adhesions. *b*. External surface of the cyst of the ovary. *c*. Wall of the cyst. *d*. Lining membrane of granulation tissue.

Acute catarrhal salpingitis results from infection along the mucous membrane. The germs are those of lesser virulence. In some of the less acute forms the germs of gonorrheal or purulent salpingitis have lost their virulence, and the purulent discharge has given place to a mucous secretion.

In purulent salpingitis (see also gonorrheal salpingitis, chap. XV) the infection may pass along the mucous membrane, or through the pelvic connective tissue directly to the tube, or, rarely, to the ovary and peritoneum, and from there to the ampulla. Infection through the intestinal adhesions may produce a mixed infection by adding the bacillus coli communis to the others.

With endometritis. Pains, backache, etc. Temperature. Leukorrhea. Menses.

14. **Symptoms and Course.** *Acute catarrhal salpingitis* usually occurs in patients already exhibiting symptoms of endometritis. Moderate pain and tenderness in the lower abdomen a little to one side of the median line, which is made worse by bodily exertion, some backache, bearing-down sensations, and scattered neuralgic pains over the body, a slight rise in temperature (99½° to 101° F.), and perhaps an increase in the amount of leukorrhea, are the most noticeable. If the menstrual flow comes on it is usually profuse.

Lateral tenderness, etc. Movement painful. Palpability.

A bimanual examination reveals tenderness and fullness on one side of the uterus, and some pain when the uterus is moved or displaced by the finger. In some cases the swollen tube can be felt.

Course.

If the patient keeps quiet the pain disappears, and the tenderness subsides in three or four days, and the recovery may be rapid.

Escape of mucus. Pain, etc. First symptoms. Slow recovery. Exudate.

In many cases more or less mucus may escape through the ostium abdominale and cause an acute pain in the corresponding iliac region, local tympanites, a temperature of 101° or 102° F., a hard, full pulse, and sometimes nausea. These symptoms are often the first to attract attention. The patient then recovers more slowly, and a small pelvic exudate may, for a few days, be felt beside or behind the uterus after the tenderness has somewhat subsided.

Similar. More pronounced, etc.

15. The symptoms of *purulent salpingitis* engrafted upon a chronic endometritis may be similar to those of the catarrhal form, but they are more pronounced in character and slower in subsiding.

Escape of pus. Slight peritonitis. Extensive. Severe symptoms. Exudate. Extension Duration.

When pus spills through the ostium abdominale, the peritonitis may not be much more severe than when mucus escapes (par. 14), for only a drop or two may have escaped. In some cases, however, the escaping pus causes an extensive pelvic peritonitis, with great tympanites, high temperature (102° to 104° F.), rapid pulse (100 to 120), extreme pelvic radiating pains, and an abundant peritoneal and cellular exudate that becomes hard and board-like, and partly or entirely fills the pelvis. It sometimes extends above the pelvic brim between the intestines or in the omentum, where it can be felt by abdominal palpation. The exudate is usually more or less resonant upon percussion. These symptoms will last for many days, and the patient may be confined to the bed for two, three, or even seven or eight weeks.

Recovery and recurrence. Exudates.

She may then entirely recover, as far as her symptoms are concerned, for a few weeks, or months, or even years, when, after a season of over-exertion, exposure to cold, or sexual excesses, more particularly at the menstrual period, she will be taken with a similar attack of (recurrent) peritonitis. The exudates have been observed to appear and disappear with remarkable rapidity during these acute attacks.

May not subside.

In many cases the symptoms do not subside completely (see par. 16).

Progressively worse.

When ulceration into the intestines, bladder, or through the external skin takes place, the symptoms become progressively more severe until they are suddenly relieved by the discharge of the pus.

Direct infection, chills, etc. Temperature. Pulse.

When the attack results from direct infection during or after abortion or operative procedures, chills, exacerbations of fever, sweating, diarrhea, and the other symptoms of general infection predominate. The temperature, within forty-eight or seventy-two hours, may reach 104° or 105° F., rising and falling three or four degrees once or twice daily, being highest in most cases in the afternoon or early evening. The pulse

Pain. ranges from 100 to 140. The pain may be severe, but often it is noticeable by its absence, even when the abdomen is distended and the pelvic peritoneal cavity filled with pus. General peritonitis. General peritonitis and abdominal distention, labored respiration, a thready pulse, persistent vomiting of a dark-green fluid, and mental anxiety or delirium may supervene and end Death. in death.

Vaginal examination. A vaginal examination reveals an enlarged, sensitive uterus surrounded by tender, infiltrated tissues in which a hard mass Abdominal palpation. may or may not be found. Abdominal palpation reveals a tender exudate extending from the enlarged uterus, or perhaps only tympanites, or, in rare instances, nothing abnormal except deep-seated tenderness.

Long-continued. 16. The symptoms of *interstitial salpingitis*, *pyosalpinx*, and *tubo-ovarian abscess* usually extend over a long period of History. time. There may be a history of a single acute attack of salpingitis or pelvic peritonitis, or no history of the early stages whatever. Not uncommonly there have been recurrent attacks of pelvic peritonitis with intervals of good health, or, more often, intervals of semi-invalidism, during which the patient is more or less incapacitated by pelvic pain from the Pus present. ordinary duties and enjoyments of life. When pus is present Temperature, pain, sweats, etc. there is apt to be a daily afternoon rise of temperature to 99° or 100° F., or even higher, with or without burning, throbbing pain in the iliac region, periodic sweats, etc.

Symptoms of endometritis. Burning pain. Between the attacks the symptoms of endometritis are seldom absent. A dull burning pain in one or both iliac regions, that may radiate to the lumbar, gluteal, or sciatic region, is Colicky pain, etc. one of the most constant. Paroxysms of colicky pains referable to contractions of the uterine or possibly the tubal walls, or to traction upon adhesions by intestinal or vesical activity, are observed in the nodular form (Schauta). Dysuria, painful defecation, increase of pain after physical exertion, and for several days preceding, as well as during menstruation, dyspareunia, metrorrhagia, and intermittent or constant leukorrhea are prominent. After the disease has lasted a long time, and the septic influences have disappeared, or have become less pronounced, the menses may be of normal amount but delayed; or they may drag along for a few days beyond the period; or amenorrhea and a premature menopause may supervene. Sterility is the rule.

Later symptoms.
Menses.
Sterility.

Sympathetic congestion of the mammary glands, nausea, dyspepsia, hysteria, or neurasthenia may add an unpleasant variety to the clinical picture.

Sympathetic and nervous.

A physical examination reveals enlarged, hard, tender, rounded or oblong masses behind or beside the uterus, or high up on one or both sides of the uterine horns, that restrict or abolish its mobility, or fix it in one side or in the front part of the pelvis. A nodule can sometimes be detected in the isthmus or pedicle, particularly of interstitial salpingitis. The discharge issuing from the cervix may be a thick, exceedingly tenacious mucus, or a mucopus.

Masses beside uterus.
Restricted mobility.
Nodule.
Discharge.

The uterus is usually in a state of subinvolution or general metritis.

Subinvolution.

17. The symptoms of *hematosalpinx*, *hydrosalpinx*, *tubo-ovarian cyst*, and *atrophy* of the tube are similar to those of pyosalpinx, but are usually less pronounced. They are noticeable for their chronicity.

Less pronounced.
Chronicity.

These cysts feel more elastic to the vaginal touch, and do not immobilize the uterus so thoroughly. When the tube is atrophied restriction in the mobility of the uterus, and small, hard, irregular elevations or ridges on the posterior surfaces of the latter and of the broad ligaments, are usually found upon examination. The uterus is apt to be retroflexed.

Elasticity.
Less fixation.
Atrophy.
Retroflexion.

CHAPTER XI.

SALPINGITIS AND ITS COMPLICATIONS (*Continued*).

(*Oophorectomy, Vaginal and Abdominal Hysterectomy for Diseased Appendages.*)

1. **Diagnosis.** The ordinary physical signs have been given with the symptoms.

High exudate. Abdominal pain. Nausea. Relationship.

Appendicitis is distinguished from salpingitis by the high position of the exudate, the abdominal rather than pelvic seat of pain, the greater tendency to nausea, the relation of the attacks to stomach and bowel disorders, and the absence of any relation to the functions or conditions of the genital organs.

Low down, etc. Fused with cervix. Location. Unilateral. Sulcus. Behind cervix. Bilateral. Ovary.

The exudate of *pelvic cellulitis* is usually low down in the pelvis, is hard and inelastic, and is fused with the walls of the cervix, and extends toward the walls of the pelvis, either laterally along the vesicovaginal septum, or around the rectum, and is, as a rule, unilateral (chap. XII, par. 9). *Enlarged tubes* are felt as rounded or elongated bodies with a sulcus between their lower and anterior borders and the uterine walls, and if low down extend from the uterine cornua down behind the cervix rather than beside it. The condition is more often bilateral. They can in a few cases be felt to be adherent to and partly surrounded by the somewhat softer tube.

In young girls it should be remembered that pelvic inflammation is apt to depend upon genital tuberculosis or an inflamed dermoid cyst. In the former the condition comes on gradually and without apparent cause, and is usually associated with tuberculous deposits elsewhere. In the latter a single adherent globular tumor is felt.

Mistaken for myoma.

2. *Pyosalpinx*, *tubo-ovarian abscess*, and *ovarian abscess*, particularly if the uterus be enlarged and hardened by interstitial metritis, may be mistaken for a myoma in the broad ligament projecting from the lateral uterine wall; or the uterus and

inflammatory mass may be so united that the whole simulates a fibroid uterus. But the history of inflammation, the restricted mobility and tenderness of the tumor, and the dark-colored, congested cervix indicate its inflammatory nature.

History. Mobility. Tenderness. Cervix.

Ovarian papilloma or *cystoma* developed among previously adherent uterine appendages or in the broad ligament can not always be differentiated. However, their elasticity and the gradual progressive augmentation of pain and increase in size sometimes aid in the diagnosis.

Not always differentiated. Elasticity. Progressive symptoms.

A *pedunculated intraperitoneal fibroid* is hard, insensitive, movable, and can usually be traced to the uterine walls. The adnexa are found on either side.

Physical qualities, etc. Adnexa.

3. *Hydrosalpinx* and *tubo-ovarian cyst* may be mistaken for a small ovarian tumor or parovarian cyst and tubal pregnancy. See diagnosis of ovarian tumors (part XII, chap. II, par. 11).

Reference.

A *parovarian cyst* is softer and has no traceable connection with the uterus, no constrictions and no symptoms, and is not so liable to be found in the culdesac of Douglas.

Softer. Connection with uterus, etc.

A *cyst of the broad ligament* is soft and fills the broad ligament flush with the uterus, has no pedicle, lies under or in front of the ovary, and has no previous history of symptoms.

Soft. Fills ligament. No pedicle, etc.

Tubal pregnancy is distinguished by the accompanying symptoms of that accident (part 14).

Symptoms.

Hematoma is usually a large circumscribed globular mass, elastic at first, but later harder, smaller, and more irregular in shape. It displaces the uterus to a greater degree, and has originated with little or no fever.

Signs. Changes. Displacement, etc

Anesthesia may be necessary to render these distinctions apparent.

4. *Hematosalpinx* feels like a pyosalpinx with but few adhesions, or like a small hydrosalpinx with adhesions. It is oblong, slightly fluctuant, is more or less constricted in places, and can be traced to the uterine horn. It is usually unilateral.

Comparison. Physical signs. Unilateral.

History. Exudate. Adhesions. Tube. Tenderness, etc.

5. *Atrophy of the tube* may be suspected when there has been a long history of pelvic inflammation and sterility, and an ill-defined or only a small exudate on the posterior surface of the broad ligament. The fundus uteri is often drawn back and held by adhesions. The tube can sometimes be felt as a hard cord adherent beside the uterus or behind the broad ligament. There may be but little tenderness in the pelvis and but few symptoms.

Adhesions to the rectum can be discovered by means of rectal palpation, by the symptom of painful defecation, and by the occasional passage in some cases of mucus or bloody mucus. Adhesions of the bladder can be diagnosed by the cystoscope. The mucous membrane over the adhesions is congested, sometimes edematous, and is drawn into folds that persist when the bladder expands.

Restoration. Reproduced. Purulent salpingitis. Sterility.

6. **Prognosis.** *Catarrhal salpingitis* frequently ends by a restoration of the tube to an approximately normal condition. The disease is, however, apt to be reproduced by the accompanying endometritis, and a purulent salpingitis be established. Sterility may result if both sides are affected.

Escape of pus. Peritonitis, etc. Interstitial. Sterility, etc. Recovery.

Purulent salpingitis may endanger life through the escape of a large quantity of pus through the ostium abdominale, and a consequent general peritonitis or abscess formation. In many cases it runs into the interstitial form. There is generally prolonged sterility, with a supposed liability to the occurrence of ectopic pregnancy. Recovery without serious injury to the parts may take place.

Chronic invalidism. Like pyosalpinx. Recovery. Adhesions.

Interstitial salpingitis usually means chronic invalidism of mild or severe form. In some cases it involves all of the danger, and exhibits all of the obstinacy, of pyosalpinx, in others a gradual improvement of both the local and general symptoms, a recovery from septic conditions, and a final restoration of the patient's strength and activity. Some adhesions are apt to remain.

Operation, etc.

Pyosalpinx, *tubo-ovarian abscess*, and *ovarian abscess* are practically incurable, except by operation, or evacuation of the pus or other fluid through one of the viscera, or externally through the skin. However, the virulence of the pus may diminish and the adhesions become absorbed, and the patient recover a fair degree of health as long as she takes proper care of herself.

Sympto-matic cure.

In other cases the activity of the septic conditions, aided by external influences, is attended by repeated attacks of peritonitis. The patient is bedridden a large part of the time, and is in constant danger of rupture of the tube and fatal peritonitis, or pelvic abscess or fistulæ, and progressive deterioration of the general health. Even after removal of the adnexa the patient may not regain health and freedom from pain for many months on account of disease remaining in and about the uterus. An infected stump sometimes perpetuates the inflammation after such an operation.

Repeated attacks.
Chronic invalidism.
Protracted convalescence.
Infected stump.

Hematosalpinx, *hydrosalpinx*, *tubo-ovarian cyst*, and *atrophy* of the tube, although incurable, may, under favorable circumstances, give but little trouble; but, on the other hand, may continue as a permanent annoyance to the patient. They seldom endanger life.

But little trouble.
Permanent annoyance.
Not dangerous.

7. **Treatment.** As the disease is usually the extension of an endometritis, and as one tube is affected first, much may be done in the way of prophylaxis. Acute metritis following labor, abortion, or operations, should, as soon as diagnosed, be treated by curettage and a thorough disinfection or mild cautery of the endometrium with strong carbolic acid. Subsequently antiseptic vaginal douches should be given every six or eight hours, and, if the symptoms persist, intra-uterine douches every twelve hours.

Prophylaxis.
Acute metritis.
Curettage.
Disinfection, etc.

After operations upon the uterus in the presence of septic conditions, an ice-bag kept over the lower abdomen for twenty-four or thirty-six hours is useful in limiting the reaction and thus in preventing the development of sepsis.

After operations.
Ice-bag.

Rest. Drainage, etc. Hot fomentations. 8. *Catarrhal* and *purulent salpingitis* call for complete rest in bed, and measures to favor drainage of the uterus and tube, and diminish pelvic congestion. Hot fomentations continuously applied relax the uterine muscle and favor drainage, Salines. while saline cathartics diminish the congestion. Eight gm, or two drams, of magnesium or sodium sulphate may be taken every two hours until three or four liquid stools are produced. Enema. At the first evidence of action of the laxative, an enema consisting of two tablespoonfuls of glycerin to six of water Repetition. should be used to unload the sigmoid flexure. After that the saline is given once or twice in twenty-four hours, as may be requisite to produce a couple of liquid stools daily. After the Douches. acute stage has passed, hot vaginal douches, commenced at Temperature. a temperature of 105° F. and gradually raised to 115° or even Technic. 120° F., should be given on a bed-pan with a waste tube, and Applications externally. with as little disturbance of the patient as possible. Turpentine stupes or the tincture of iodin may be applied at intervals over the lower abdomen as counterirritants.

Morphia. The administration of morphia to insure quiet and relieve pain or discomfort may be beneficial. Decided septic symp- Alcohol. toms call for alcoholic stimulants. When severe peritoneal Peritoneal symptoms. symptoms are present, vaginal douches and all manipulations that interfere with absolute quiet should be avoided.

In bed until temperature normal. The patient should be kept in bed until the temperature remains normal during the twenty-four hours, and the tenderness has greatly diminished or disappeared. This may re- Getting up. quire several weeks. Then she may be allowed out of bed, but should lie down from two to three hours in the middle of each day, and remain in bed during the menstrual period. Intercourse. Antiseptic douches. Laxatives, etc., continued. Restrictions kept up. Sexual intercourse should be prohibited. Antiseptic vaginal douches, occasional saline laxatives, and counterirritation over the lower abdomen should be continued. These restrictions should be kept up for weeks or even months, in case there be any signs of tubal disease remaining, for it is only in this way that recurrent attacks can be avoided and the absorption of exudates be secured.

Laxatives, etc. Douches. Rest.

9. In *interstitial salpingitis* and *cystic degeneration*, laxatives, counterirritation over the pubes with tincture of iodin, hot douches, and rest in bed of two hours in the middle of the day are indicated.

Local treatment. Frequency. Dilation. Disinfection. Scarification. Ichthyol. Ichthyol tampon. Wool tampon. Tincture of iodin.

Local treatment is not well borne in some cases, but in others is decidedly beneficial. It should be made three times a week. The cervix is kept dilated with sounds under antiseptic precautions, as recommended elsewhere for endometritis (chap. VIII, par. 18), and the uterine cavity disinfected by swabbing it out with a mild but efficient antiseptic. If the cervix appear much congested it should be scarified each time. A 25 per cent. solution of ichthyol in glycerin answers well as an intra-uterine application. Then a small tampon of cotton saturated in glycerin, or in a ten per cent. solution of ichthyol in glycerin, is placed against the cervix and a dry wool tampon under that, large enough to loosely fill the vagina and act as a support to the inflamed structures, but not large enough to cause discomfort. If the patient bears the treatment well, the cervical cavity should each time be swabbed out with the tincture of iodin.

Electricity. Dosage. Vaginal. Uterine.

10. In the latter stages of interstitial salpingitis, when there is but little tenderness, and no evidence of pus in the pelvis, electricity favors the absorption of the exudate. Mild doses, 25 to 40 milliampères, are as large as it is usually safe to use. If the adnexa are in the recto-uterine pouch, a vaginal electrode (25 milliampères) should be used; if situated higher up, an intra-uterine electrode may be tried.

Massage.

Pelvic massage, according to Thuré Brandt, is beneficial in the same class of cases.

It has been recommended to drain the tube by dilating the uterine horn by a catheter or sound (Walton), or by packing the uterine horn with iodoform gauze, changing the packing daily (Dorsett). By the first method the tissues may be injured; by the second, an acute attack of purulent salpingitis may be produced. Their value and safety have not yet been established.

While the patient is thus restricted as to exercise, her diet must be regulated, the secretions kept in order, and the general circulation be stimulated by general massage, electricity, and selected Swedish movements.

It is sometimes possible, in this class of cases, to break up the adhesions whilst the patient is anesthetized. The organs are grasped between the hand over the abdomen and one or two fingers in the rectum, and carefully peeled out of their adhesions. Very old and firm adhesions, and those connected with pus tubes, should only be separated after the abdomen has been opened (part VI, chap. IV, par. 8,—Separation of Adhesions).

Peritoneal section. Adhesions. Removal. Operations.

11. When the symptoms are severe enough to disqualify the patient from the enjoyment of life, and treatment proves of no benefit, the peritoneal cavity should be opened and the adhesions be broken up. If the tubes are occluded and the ovaries very much altered by inflammation, they should be removed, and the uterus if displaced be restored by shortening the round ligaments by hysterorrhaphy or vaginal fixation (part VI, chap. IV, par. 18, 19, and 20).

Septic cases.

Cases in which pus in the tubes or ovaries with septic manifestations can be demonstrated should be subject to operation without delay.

Between attacks. Immediate operation.

During acute attacks it is preferable to delay, and operate between attacks, if it then be found necessary. But symptoms threatening general peritonitis or an acute local peritonitis that steadily increases in severity may call for an immediate removal of the adnexa, and possibly of the uterus.

Evacuation below. In culdesac. Aspiration. Symptomatic cure.

Evacuation of the pus from below is indicated in exceptional cases only. An accumulation of pus, or a thin-walled fluctuating pyosalpinx of large size in the culdesac of Douglas, may be aspirated, and the advisability of its removal be discussed afterward. In cases in which the pus has lost its septic qualities, this has sometimes been followed by a symptomatic cure. A fistulous opening in the rectum or vagina should be dilated and kept open by a drainage-tube or repeated dilations with the finger (see chap. XII, par. 14). The tube may be removed after suppuration has ceased if it still causes troublesome symptoms.

Drainage.

Removal.

When, however, one tube and ovary are healthy they should in young patients be left, and the accompanying endometritis be thoroughly treated afterward to prevent their infection. If the ovaries are comparatively healthy and one or both tubes occluded, but not otherwise much changed in appearance, the ampulla may be opened and the ovary stitched over it with catgut so as to project into its lumen. This renders subsequent impregnation possible. Pozzi removes diseased ovarian tissue by cutting out a wedge-shaped piece and suturing the edges with catgut, or by merely incising or cauterizing the cyst walls with the actual cautery. He then sutures the fimbriæ of the tube to the remains of the ovary.

Removal of one tube, etc.

Endometritis.

Opening ampulla.

Impregnation.

Resection and cautery.

Suture of fimbriæ.

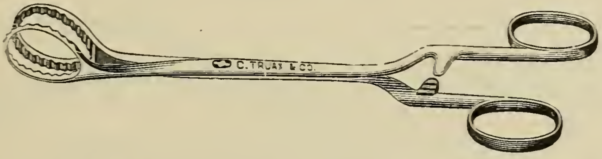


FIG. 230.—OVARY FORCEPS, FOR VAGINAL OOPHORECTOMY. THE AUTHOR'S MODEL.

12. **Vaginal Oophorectomy.** When the adnexa and fundus uteri are situated low down in the pelvis, either on or between the sacro-uterine ligaments, they can be reached through a median or transverse incision in the posterior vaginal fornix large enough to admit two fingers (posterior colpotomy). After the adhesions are separated the ovaries and tubes are drawn into the vagina for inspection and possible removal. When the ovaries are movable, or adherent near the uterus, and not in the culdesac of Douglas, they can be removed by a T-shaped vaginal incision in front of the cervix,

Appendages in or over culdesac.

Beside uterus.

and a separation of the bladder from the uterus (anterior colpotomy).

The steps of posterior colpotomy are as follows: Disinfection of the vagina and uterus (usually curettage), introduction of vaginal retractors and placing of a ligature through the lips of the cervix for traction (part I, chap. IV, par. 8). The cervix is then drawn down, and a median line or transverse incision about four cm., or a little more than one inch long is made with scissors in the fornix, just behind the posterior wall of the cervix. Hook up connective tissue in the incision and snip it with scissors until the peritoneal cavity is opened. Remove the retractors, pass two fingers into the culdesac, loosen appendages from their adhesions, aspirate contents if sac be large, draw the adnexa (one side at a time) into the vagina, grasp with ovary forceps, introduce lateral retractors, transfix the pedicle, ligate it in two parts, amputate the adnexa, tie pedicle again *en masse*, disinfect the stump, douche off and release the pedicle. Douche out the culdesac with sterilized water and close the wound with catgut sutures. If there be much oozing, a drainage-tube, or, in bad or decidedly septic cases, a gauze tampon, may be put in the culdesac and brought out at the lower unsutured angle, to be removed in thirty-six hours. The uterus, if retroverted, should be replaced, and the cervix be tamponed well back in the pelvis by strips of iodoform gauze.

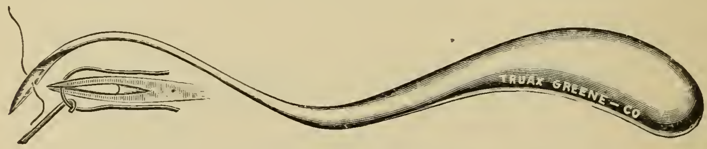


FIG. 231.—PEDICLE NEEDLE WITH SPLIT EYE. (*Binkley.*)

In performing anterior colpotomy the cervix is drawn and a transverse incision three cm., or one inch long, is made at the junction of the anterior vaginal wall with the cervix, and the bladder separated from the uterus by finger pressure. Then a median vaginal incision is made from the first incision forward far enough to gain room for free manipulation through it with two fingers. The bladder is separated from the vaginal wall for a short distance on either side. In most cases the appendages can be drawn into the vagina by two fingers. If we make the incisions a trifle longer, the fundus can be drawn into the vagina by grasping the uterine attachment of the round ligament with hemostatic forceps, and the adhesions be exposed to inspection. The appendages are tied and cut off, and the incision closed by transverse vaginal sutures that include the connective-tissue coat of the bladder. A narrow strip of sterile iodoform gauze should be left between the posterior sutures for twenty-four hours to drain the space between the uterus and bladder. Twelve hours after the removal of the gauze a vaginal douche of 1 : 2000 solution of corrosive mercuric chlorid, followed by a sterilized plain douche, should be given, and be repeated twice daily. (See part VI, chap. IV, par. 19, small type.)

Instruments: One perineal and two long vaginal retractors, a long-handled sharp-pointed pair of scissors, ovary forceps, uterine sound, five or six long-handled hemostatic forceps, pedicle needle, needle-holder, sponge holders, aspirating syringe or small trocar, tenacula, needles, suture material, strips of antiseptic gauze, sponges, douche bag with glass nozzles, etc.

Adnexa high up and laterally.

Abdominal incision, etc.

13. **Abdominal Oophorectomy.** When the adnexa are situated high up and laterally in the pelvis, an abdominal incision two inches long in the median line over the pubes should be made, two fingers introduced, the pelvic cavity explored, the adhesions separated, and the adnexa removed if necessary. The uterus, if retroverted, should be stitched to the abdominal wall (part VI, chap. IV, par. 20).

Suspension of uterus.

Steps of the operation: Abdominal incision (part I, chap. IV, par. 7), separation of omentum if adherent, breaking up of adhesions of appendages, drawing one ovary and tube out into view, ligature of pedicle at uterine horn, amputation, disinfection of the stump. Removal of other ovary and tube, introduction of a glass drainage-tube if necessary for persistent oozing, closure of wound with silkworm-gut sutures. When the adhesions are firm it is better to aspirate enlarged tubes for fear of rupture. Bleeding from adhesions may be checked by ligature or catgut suture. Large vascular bands should be cut between two ligatures. Fleshy pedicles are ligated in several sections. Trendelenburg's position should be used in complicated cases.

Instruments: Knife, scissors, a dozen or more hemostatic forceps, tissue forceps, pedicle needle, needles for abdominal wound and intraperitoneal work, sponge-holders, ligature and suture material, needle forceps, aspirating syringe, gauze, sponges, etc.

14. **Hysterectomy for Diseased Appendages.** In some cases the uterus and pus tubes are matted together so extensively and firmly that an oophorectomy would be almost im-

Oophorectomy impracticable.

possible and extremely dangerous, or the uterus is badly diseased. Segond, Péan, Jacobs, Landau, Henrotin, and others, perform a vaginal hysterectomy in such cases. The appendages are freed of their adhesions and removed with the uterus, when such a procedure is possible. Otherwise, the uterus is removed, and pus sacs that can not safely be enucleated are opened and drained, hemostatic forceps being used upon broad ligaments and bleeding points, and the vagina and space between the forceps tamponed with folds or strips of iodoform gauze, which is left in place for four or five days, unless a rise in temperature after forty-eight hours makes its removal necessary (see part 9, chap. III, par. 23 and 24). Thus the pus is evacuated, and the remains of the diseased structures, not being able to retain any pus, contract and heal. Sometimes the free abdominal cavity is not opened, and the upper adhesions are not disturbed. The results are good, and the mortality less than that of abdominal section for such cases.

Vaginal hysterectomy. Pus sacs. Forceps. Tampon. Remaining structures. Cavity not always opened. Results.

Polk, Pryor and others in this country, recommend removal of the entire uterus (including the cervix) and appendages through an abdominal incision for the same or similar conditions. Baldy and others prefer to leave the cervix. When induration can be felt by the hand pressed over the pubes, and but little about the cervix by the vaginal finger, the abdominal method is preferable.

Abdominal method. Leaving cervix. Choice

CHAPTER XII.

PELVIC CELLULITIS.

(*Parametritis*, *Parasalpingitis*, *Paraproctitis*, *Paracystitis*, *Adenolymphitis*, *Phlegmon of the Broad Ligament*, *Pelvic Abscess*.)

1. **Pathology.** Pelvic cellulitis, or inflammation of the pelvic connective tissue, occurs in three varieties: serous, plastic, and suppurative inflammation.

Varieties.

Serous inflammation is characterized by hyperemia and serous- and round-cell infiltration that transforms the tissue into a gelatinous mass. It extends from the vagina, uterus, uterine adnexa, bladder, or rectum, as the result of septic inflammation in these organs. The serum is absorbed within a few days, leaving some induration and permanent impairment of the integrity of the tissue, such as the disappearance of some fibers and cicatricial contraction of others. The effusion may spread through a large part of the tissue, and be attended by some intraperitoneal effusion, and in the puerperal state may prove rapidly fatal.

Hyperemia. Infiltration. Extension. Absorption, etc. Spread. In puerperal state.

Plastic inflammation takes the form of an effusion that extends from an area of traumatism, or purulent inflammation, along the lymphatics, and rapidly solidifies and thus localizes itself. The region beside the vagina and cervix and that contiguous to the Fallopian tube (Fig. 233) and ovary are most often affected. The exudate may undergo gradual absorption, or it may end in suppuration.

Extension. Local. Region. Results.

Suppurative inflammation consists of an exudate of the plastic variety, generally in connection with traumatism and direct infection, in which the pus germs enter the tissues in such quantities that general suppuration occurs; or the plastic lymph is liquefied in places, forming septic foci removed from the point of infection, or multiple small abscesses. Cellulitis is more often unilateral.

Plastic exudate. Germs. Septic foci. Unilateral.

2. The ovary, Fallopian tube, and pelvic peritoneum, one or all, may be affected by the spread of the disease, although healthy at the beginning, and may remain as the more or less permanent effects. The lymphatics undoubtedly play an important part in transmitting the infection, but it is difficult as yet to estimate their exact importance.

Extension. Permanent results. Lymphatics.

Streptococci are present in the majority of cases, particularly in those that suppurate early and extensively. The staphylococcus aureus and albus, the gonococcus, the bacteria

Germs.

of decomposition, the bacillus coli communis, the pneumococcus, and other pathogenic germs, have been discovered.

The ordinary seat of the pelvic abscess is in the lower portion or base of the broad ligament, below the ureter, and beside the cervix. It may burrow forward along the round ligament and through the inguinal canal, or laterally into the iliac fossa and from there forward or backward along the iliac and hypogastric vessels, or posteriorly along the sacro-uterine ligament into the lumbar region, or out through the lesser sacrosciatic foramen, or along the obturator vessels to the thigh, or it may ulcerate through the pelvic floor into the ischiorectal fossa. It may also rupture into the bladder, rectum, or externally through the skin. (Fig. 233.)

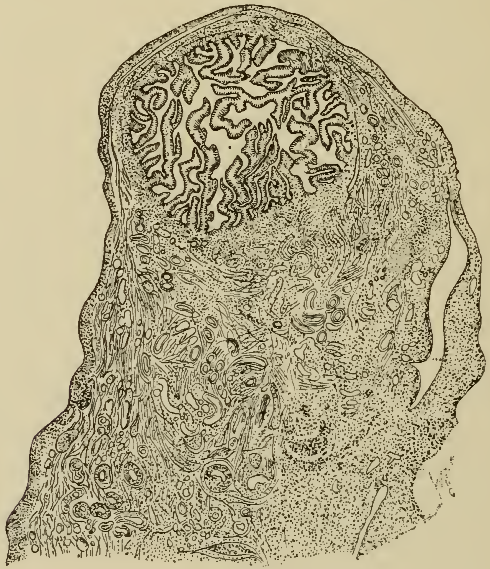


Fig. 232.—Plastic Cellulitis of the Mesosalpinx, Secondary to Gonorrheal Salpingitis. (*Bland Sutton.*)

The term pelvic abscess is not intended in this connection to include peritoneal accumulations of pus nor suppurating hematomas.

Contraction. 3. As the result of previous mild attacks of cellulitis, local or diffuse cicatricial contraction may take place in the connective tissue (Freund). Striæ or small bands of cicatricial tissue extend from the organs, more noticeably from the cervix, through the pelvis, drawing them out of place. One or both sacro-uterine ligaments are apt to be affected, constituting *parametritis posterior* (B. S. Schultze), and drawing the cervix backward and to one side. Or the whole pelvic connective tissue may be affected, constituting *parametritis atrophicans* (Freund). In the latter cases a condition of the uterus resembling senile involution is usually present.

Striæ.

Sacro-uterine ligaments.

Whole tissue.

Senile involution.

Parametritis atrophicans located about the rectum is called paraproctitis; that about the bladder, paracystitis; and that in the mesosalpinx, parasalpingitis.

4. **Etiology.** The causes of pelvic cellulitis are inflammation in the pelvic viscera, and traumatism with primary or secondary infection. Over-exertion, sexual indulgence, operations upon the uterus, etc., during the existence of salpingitis or ovaritis, are accountable for many attacks that are, however, usually complications of pelvic peritonitis. Rupture of a pyosalpinx or ovarian abscess into the broad ligament causes purulent cellulitis. The traumatisms of labor, abortion, and operative procedures with secondary infection usually produce serous or plastic cellulitis, but with primary infection give rise to the purulent variety. Blennorrhagic disease, cancer, tuberculosis, pelvic tumors, etc., are occasionally the originating causes.

Visceral inflammation.

Traumatism with infection.

Diseased appendages.

Rupture of pus sac.

Labor, abortion, etc.

Blenorrhagia, etc.

5. **Symptoms and Course.** The attack may begin with or without a chill. The temperature rises to between 100° and 103° F. (in puerperal cases often higher), and the pulse becomes full and somewhat accelerated, with aching in the pelvis and limbs, headache, dry, furred tongue, great thirst, malaise, drowsiness, and dryness of the skin. The pelvic pain becomes acute, the lower abdomen increases in fullness, and, when the peritoneum is also affected, the stomach grows

Chill, temperature, pulse, etc.

When peritoneum affected.

Para-metrium.

irritable. The parametrium is tender, and gives a full, doughy sensation to the examining finger.

Recovery. Induration, exudate, etc. Cervix.

The symptoms may become less pronounced in a few days, and the case go on to recovery, the temperature remaining a degree or two above normal for a week or two. Small areas of induration may be palpated about the uterus, or a solid exudate felt to extend from the cervix to the lateral pelvic walls, or behind the cervix and around the rectum, lasting for several weeks, and immobilizing the uterus. The cervix appears congested or inflamed.

Progressive septic symptoms. Hard mass. Fluctuation. Displacement. Extension. Pain. Tenesmus. Abscess.

6. In other cases the temperature, after three or four days, rises considerably above the average once or twice in twenty-four hours, and may go down almost to normal between times. Perspirations become profuse, and paroxysms of pain in the pelvis make their appearance. Chilly sensations or distinct rigors may supervene. There is a distaste for food, and in some cases an offensive diarrhea. A large, hard mass is felt in one side of the pelvis which may or may not present the signs of fluctuation at some point. It usually presses the uterus to one side, and causes some bulging of the vagina, but may extend across under the posterior vaginal fornix, or upward, forward, or backward to the pelvic brim. The pain is felt in the direction toward which the abscess is developing or burrowing, rectal or vesical tenesmus being noticeable when it is ulcerating toward one of these viscera. The abscess finds an exit in from one to three or four weeks.

Salpingitis. Bursting into broad ligament. Uterus and cervix. Exudate. Suprapubic signs.

7. The symptoms of plastic cellulitis in connection with salpingitis are merged in the symptoms of that disease. A pyosalpinx that bursts into the broad ligament produces an extensive board-like induration in the pelvis. Both the uterine body and the cervix are immobilized. A hard ring may extend around the cervix, or the rectal vault may be spanned by a bridge of exudate involving the rectovaginal septum. Some suprapubic tenderness, induration, and often

tympanites are present. Rectal palpation will reveal hard masses high up on either side of the rectum and over its anterior wall, apparently extending into the posterior and lateral pelvic walls near the brim.

Rectal palpation.

8. If the abscess discharge into the vagina, as is often the case, there is a gush of pus with relief of pain followed by a rapid recovery or by a second accumulation with rapid repetition of symptoms. If it discharge into the rectum, a sudden purulent diarrhea brings relief, although the symptoms are apt to return. The pus sometimes burrows along the rectal walls, discharges imperfectly, and thus goes on reaccumulating almost indefinitely, particularly when connected with a pyosalpinx, and may finally exhaust the patient. The walls of the lower rectum are usually felt by the examining finger to be expanded or ballooned, and do not collapse.

Into vagina.
Into rectum.
Burrowing.
Reaccumulation.
Exhaustion.
Rectal walls.

An abscess opening into the bladder generally reaccumulates many times, and tests the endurance of the patient very severely. When it extends toward the cutaneous surface it is amenable to treatment, and heals within a reasonable period of time.

Into bladder.
Toward skin.

9. **Diagnosis.** From *diseased uterine adnexa* cellulitis may be known by the close relation of the exudate to the vagina, cervix, or anterior or lateral uterine walls. The exudate feels as if it had been fused with one or more of these parts, and occupies the lower and anterior part of the pelvis. The diseased adnexa are either higher up or farther back, occupying the upper and posterior portions of the pelvis, and form more definitely and regularly defined masses.

Relation of exudate
As if fused.
Adnexa.

Solid tumors of the broad ligament have more of a rounded contour, and their walls form an acute angle with the walls of the uterus where they lie against it, instead of extending straight out from the uterus as does the exudate.

Contour.
Angle formed.

Myomas move with the uterus, and do not immobilize it until large enough to distend the broad ligament, and then

Less rigidity.

Less tender. Cervix. not as rigidly as the parametric exudate of the same size. They are not as tender, and the cervix is not congested or inflamed.

In puerperal state. 10. **Prognosis.** Pelvic cellulitis occurring in the puerperal state may prove fatal in two or three days from the intensity of the septic invasion, or in one or more weeks from septic exhaustion. Seldom fatal. At other times the disease is seldom fatal. Outlet for pus. Pus, when formed, may be expected to find an outlet sooner or later, and recovery may then be rapid or slow. Exhaustion. Occasionally the suppuration will last for years and finally eventuate in the death of the patient.

Disinfection and limitation. 11. **Treatment.** The *prophylactic* treatment consists in disinfection of the tissues from which the infection proceeds, and in measures to limit inflammatory reaction. A thorough disinfection of a septic uterus or other pelvic organ operated upon, both before and after the operation, an ice-bag on the abdomen after the operation, and subsequent antiseptic douches, constitute examples. Examples.

Salpingitis. The treatment of the *acute stage* is the same as for salpingitis (chap. XI, par. 8).

12. In the *chronic non-suppurating forms* (parametritis posterior and atrophicans), in addition to local treatment of the accompanying endometritis, Endometritis. the vagina should be tamponed as recommended for mechanical support (part I, chap. IV, par. 10 and 11). Tamponade. Massage. Pelvic massage may also be of benefit in stretching cicatricial contractions and in invigorating the circulation (part I, chap. V, par. 8 and 9).

Massage for chronic cellulitis without a palpable exudate is performed somewhat as follows: One or two fingers of the left hand are introduced into the vagina (dorsal recumbent posture) and the cervix pressed upward and backward, anteverting the uterus. The other hand on the abdomen makes circular friction motions over the fundus uteri, gradually working toward the cervix, then presses upon and strokes the sacro-uterine ligaments and bases of the broad ligaments from the uterus backward and sidewise.

In parametritis posterior the vaginal fingers pull the cervix forward while the hand over the abdomen pulls the fundus forward, and thus stretches the ligaments moderately. This should be repeated two or three times. Then friction movements are made over the broad ligaments, commencing at the sides of the uterus. If there be contraction on one side, first the cervix is drawn toward the opposite side by the vaginal finger and then the whole uterus bimanually (part 1, chap. v, par. 9).

13. If *suppuration* takes place, it is well to watch and wait until its location can be determined. The pus should be evacuated through the vagina when the abscess wall bulges below the cervicovaginal junction. An exploring needle should be introduced, and when pus is found a sharp pair of scissors may be thrust along the needle and the points be separated and withdrawn. Bleeding vessels may be caught by hemostatic forceps and held until the vessels are secured, or the forceps may be left on for a few hours. The cavity is washed out thoroughly, its walls curetted by the finger, and a double drainage-tube introduced. The cavity can then be irrigated twice daily until obliterated. A one or two per cent. solution of carbolic acid makes a good mild antiseptic and stimulating wash.

Evacuation. Through vagina.
Needle.
Scissors.
Forceps.
Cleansing, etc.
Double tube.
Irrigations.
Carbolic acid.

Small or fistulous openings into the vagina should be probed and enlarged, and if possible laid wide open.

Fistulæ.

When there is any doubt as to the character of the tissue to be traversed, it is better to dissect our way along the aspirating needle and tie vessels as we cut them. The surgeon should keep below the level of the cervicovaginal junction in order to avoid the ureters and uterine arteries. Abscesses between the bladder and uterus should be opened by a short transverse incision in front of the cervix, and a longer incision extending forward in the median line. The bladder is then separated from the uterus, if not already separated, until the abscess is reached.

When the abscess bulges against the rectal wall, and is separated from the vaginal wall by considerable indurated connective tissue, the author has successfully opened and rapidly cured them by puncturing through the anterior rectal wall as low down in the *median line* as practicable. When an old abscess discharges into the rectum well below the sacro-uterine ligaments, as most pelvic cellular abscesses do, the finger may be forced into it, and can usually find a pus track along the mucous membrane. By tearing through the mucous membrane along its whole course, the drainage becomes perfect, and the cavity rapidly contracts. It is an easy matter to tear this track open again if it closes too rapidly. Such manipulations are only admissible well below the sacro-uterine ligaments, near which the large vessels are situated. The vessels below are not large, and can easily be caught by forceps or tamponed. The author has done it a dozen or more times, and has seen it done many more times, and has never seen a vessel wounded that required attention. The sphincter ani should be dilated in order to facilitate drainage and rectal lavage. The rectum should be washed out three or four times daily with large quantities of water. The rectum can be exposed to view as high as the sacro-uterine ligaments by Sims' speculum, introduced in the left-lateral, or Sims' posture, or still higher by Kelly's sygmoidoscope with reflected light.

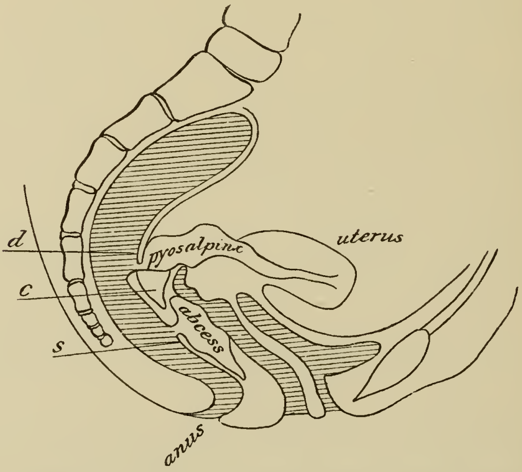


FIG. 233.—PYOSALPINX AND PELVIC ABSCESS OPENING INTO THE RECTUM.
d. Sacro-uterine folds, and region of third sphincter, where large blood-vessels are found. Pyosalpinx opens into rectum. Here extensive laceration of rectal walls would be dangerous. *c.* Culdesac of Douglas, pyosalpinx being a little to one side. *s.* Safe place to tear open the abscess walls, blood-vessels being here small and laterally situated.

These cases must be differentiated from pyosalpinx opening into the rectum at or *above* the sacro-uterine ligaments. To tear the rectum extensively in such a case might lead to a fatal hemorrhage.

Nearly all writers condemn this rectal treatment of pelvic abscesses, and advise making a counteropening in the vagina, even when separated from it by considerable connective tissue. In some cases this may be done, but many times it involves either laying open the vagina very extensively, or it leaves a fistulous track, through which it is hard to cure the abscess. In two instances openings of cystic Fallopian tubes into cellular abscesses which were discharging per rectum were dilated by the author through the abscess cavity, and the suppuration cured with relief of symptoms. Pyosalpinx discharging into rectum below the edges of the sacro-uterine ligaments has, in several instances, been cured by dilation of the opening. Theoretically, the invasion of the abscess cavity by fecal matter is a flagrant disregard of the antiseptic or asceptic principle; practically, it does not prevent a rapid cure, providing, of course, that the free drainage be maintained.

14. When the abscess has opened into the bladder, and does not heal of itself, or after repeated bladder douches, a vesicovaginal fistula may be made by cutting through the vesicovaginal septum in the median line about four cm. (1 ½ inches) beyond the mouth of the urethra, guided by a sound in the bladder. Through this the opening can sometimes be found and dilated. At other times the bladder can be dissected from the anterior wall of the cervix through the T-shaped incision, as recommended above (par. 13, small type) for reaching an abscess between the uterus and bladder. Suprapubic cystotomy has been recommended, but seldom made use of.

Vesico-vaginal fistula.

Opening found.

Separation of bladder.

Suprapubic cystotomy.

Special routes have been invented. Thus Hegar made an incision from the tuberosity of the ischium to the tip of the coccyx, and went through the ischiorectal fossa. Sänger made a vertical incision through the lower third of the labium down between the tuberosity and the anus an inch below the anus. Zuckerkandl's incision across the perineal body from one tuberosity to the other, and separation of the vagina and rectum, has been recommended for pus behind the vaginal fornix. The sacral method (Kraské and others) has been made use of. These are special methods for special cases, and are seldom of practical value for the evacuation of cellular pelvic abscesses.

15. When an abscess extends upward toward Poupart's ligament, it may be reached by an incision parallel to the liga-

Poupart's ligament.

Peritoneum reflected. Upward pressure Drainage-tube.

ment. The peritoneum may, if necessary, be reflected upward, and the abscess be elevated by pressure from the vagina made by an assistant. Sometimes a drainage-tube can be carried through to the vagina.

Lumbar region.

When the abscess points in the lumbar region, the incision should be over the crest of the ilium and preferably near and parallel to the external margin of the quadratus lumborum muscle.

It is rare that a pelvic cellular abscess requires a peritoneal section. When, however, it cannot be reached otherwise, the peritoneal cavity should be opened. It may then be treated in three ways: (1) Its walls, if thick, may be sutured to the peritoneal edges, or the space between the wound and the abscess wall may be packed with iodoform gauze. The abscess is opened after adhesions have formed and firmly shut off the abdominal cavity, viz.: in four or five days (Hegar). (2) The abscess may be aspirated, washed out, and incised, and the edges stitched into the abdominal wound. (3) Under guidance of the fingers in the abdomen the abscess may be penetrated by a trocar from the vagina, the abdomen be immediately closed, and the remaining treatment be carried out by way of the vagina (A. Martin).

CHAPTER XIII.

HYPEREMIA AND HEMATOMA OF THE OVARY.

Normal hyperemia. Persistent dilation. Serous effusion. Hemorrhage. Number. Size.

1. **Pathology.** Normal hyperemia of the ovaries exists during pregnancy and menstruation and just previous to and during the sexual act. At other times hyperemia results in persistent dilation of the vessels and some serous effusion into the stroma. In severe cases hemorrhage into the Graafian follicles takes place. The hemorrhage may remain confined to one or several follicles, or it may rupture the septa between them, and thus form one or more small clots from the size of a pin's head to that of a hazelnut, or a single one, vary-

ing up to the size of a walnut, or even larger (Figs. 234 and 235). Hemorrhage into the stroma is apt to assume the form of numerous minute extravasations.

Into stroma.

The fluid may be completely absorbed, or may remain as a coagulum or as a mass of tarry fluid, or be represented by a corrugated cyst wall containing a colloid substance, or give rise to an abscess. Rarely the follicles burst, and an intraperitoneal hematocele forms. If the hyperemia is not soon relieved, or is often repeated, it develops into inflammation. Chronic oophoritis is a frequent complication of hematoma.

Absorption.
Remains.
Colloid.
Abscess.
Hematocele.
Inflammation.
Chronic.

2. **Etiology.** Hyperemia and hematoma are caused by menstrual derangements, excessive coition during menstruation, onanism, uterine displacements, pelvic tumors, etc. Anemia, sedentary habits, and toxemia predispose to it. Blows over the ovary, extensive burns, etc., occasionally produce hemorrhage into the follicles.

Local causes.
General.

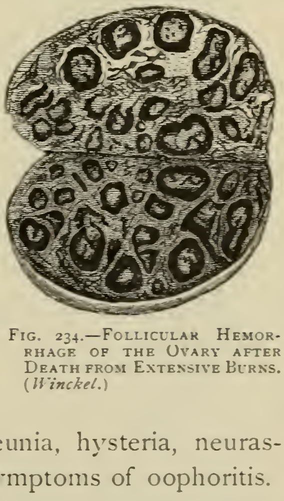


FIG. 234.—FOLLICULAR HEMORRHAGE OF THE OVARY AFTER DEATH FROM EXTENSIVE BURNS. (*Winckel.*)

3. The **symptoms** are dull pain in the ovarian region, nausea, and menorrhagia or metrorrhagia. Hematoma is apt to cause persistent pain in the ovary (made worse upon assuming the erect position), dyspareunia, hysteria, neurasthenia, and, in fact, nearly all of the symptoms of oophoritis.

Pain, nausea, hemorrhage.
Persistent pain in ovary, etc.

4. The **diagnosis** is based upon the enlargement and tenderness of the ovary with but slight if any rise in temperature, and upon uterine hemorrhage. It can not always be distinguished from chronic oophoritis.

Enlarged and tender.
No temperature.
Hemorrhage.

5. **Treatment.** At the first onset, rest in bed, an ice-bag over the abdomen, and ⅛ of a grain, or a centigram, of tartar emetic every two hours until nausea supervenes, will usually afford relief. Later, counterirritation by chloroform liniment

Rest.
Ice-bag.
Tartar emetic.
Counterirritation.

Douches, etc.

Rest during menstruation, etc.

or turpentine stupes over the lower abdomen, hot douches, ichthyol tampons, tonics, and massage are beneficial. (Part I, chap. V.) Rest in bed during menstruation, morning sponge baths, tonics, regulated out-of-door exercise, change of climate, and in some cases the rest cure (part IV, chap. X, par. 6), are indicated in cases connected with anemia, debility, and neurasthenia.

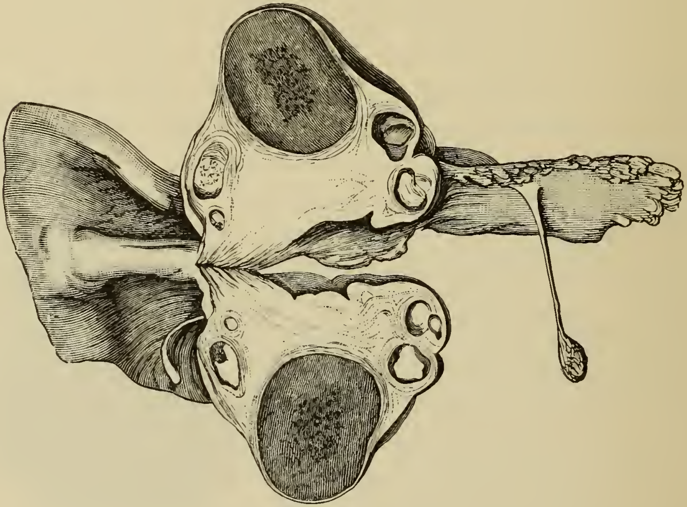


FIG. 235.—FOLLICULAR HEMORRHAGE OF RIGHT OVARY (NATURAL SIZE). FOLLICLES ABOUT TO RUPTURE. (*Winckel.*)

Oophorectomy.

It occasionally becomes necessary to excise the hematoma (chap. XI, par. 11) or remove the ovary or ovaries to relieve the patient of an unbearable burden.

CHAPTER XIV.

OOPHORITIS. INFLAMMATION OF THE OVARY.

GYROMA, ENDOTHELIOMA.

1. Oophoritis occurring as a complication of salpingitis has been described (chap. X, par. 11). *Acute* oophoritis is seldom observed except in connection with salpingitis, and in the puerperal state. *Chronic* oophoritis, independent of these conditions, usually develops insidiously, mild acute attacks being overlooked. The left ovary is more frequently affected than the right.

Acute oophoritis. Chronic. Development. Left ovary.

2. **Pathology.** In its first stages oophoritis presents the ordinary features of acute inflammation elsewhere, viz.: hyperemia, edema, and round-cell infiltration of the stroma. Streptococci are present in most cases. They penetrate the ovary at the hilum and extend for some distance along the blood-vessels. The ovisacs increase in number and size, and as the disease progresses a few continue to enlarge while others undergo atrophy (Reymond and Magill). Blood is often extravasated in one or more of the cysts. The disease rapidly ends in resolution or passes into the chronic form.

First stages. Stroma. Streptococci. Ovisacs. Blood. Termination.

3. Chronic inflammation may assume the form of a peripheral, diffuse, or hypertrophic inflammation, a sclerosis, a follicular inflammation, a cystic degeneration, or a suppurative inflammation. Among the resulting conditions of inflammation are gyroma and benign endothelioma.

Chronic oophoritis. Varieties. Resulting conditions.

In *peripheral oophoritis* or *peri-oophoritis* the tunica albuginea is sclerotic either in places or generally, and often surrounded by adhesions. The tissue underneath presents under the microscope the following conditions: Dropsical and apoplectic follicles, degenerated corpora lutea, minute interstitial extravasations of blood into, and sclerosis of, the fibrous portion (Fig. 228).

Tunica albuginea. Interior.

Vascularity, etc. *Interstitial oophoritis* is characterized by an increased vascularity about the follicles with hyperplasia advancing to sclerosis surrounding the follicles, corpora lutea, and blood-vessels. Hyperplasia, etc.

Connective tissue. In *hypertrophic oophoritis* there is a hypertrophy and hyperplasia of the connective tissue, accompanied by a progressive atrophy of the follicles. Follicles. Ovary. The ovary is enlarged and the surface lobulated and furrowed. Advanced stage. It is an advanced stage of interstitial oophoritis.

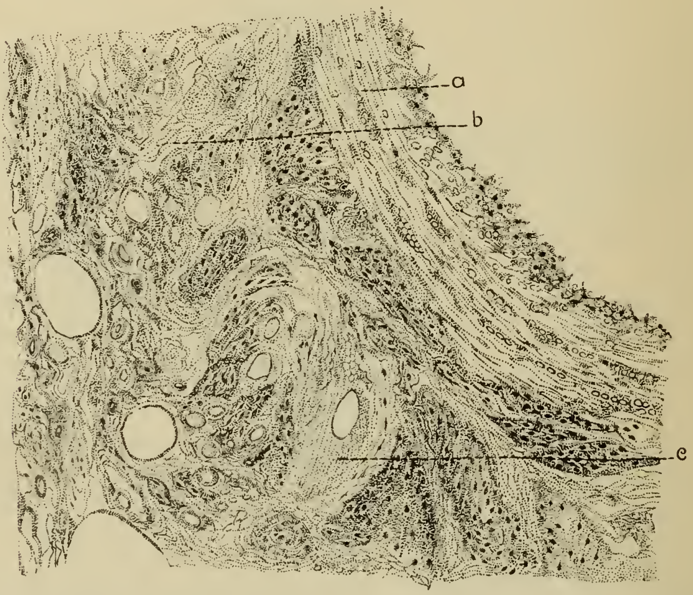


FIG. 236.—CHRONIC INTERSTITIAL OOPHORITIS. (*Prepared by Evans from Author's Case.*) *a*. Wall of cystic Graafian follicle. *b*. Ovarian stroma, great interstitial overgrowth. *c*. Masses of hyaline material.

Sclerosis, or *atrophy*, of the ovary, is the result of the above-mentioned forms of inflammation, Result. and is attended by a shrinking of the fibrous tissue Fibrous tissue. and more or less complete destruction of the ovisacs. The ovary is small, and may present a corrugated appearance, as in the senile state. Corrugated.

In *cystic oophoritis* the follicles are increased in number and size, and in some cases the stroma is edematous or sclerotic. It may be localized or involve the whole ovary.

Follicles.
Stroma.
Extent.

Cystic degeneration is an advanced stage of follicular oophoritis in which the ova and other distinctive features of the ovary are to a great extent destroyed. One or two follicles may be distended by a serous or bloody fluid from the size of a hazelnut or a small egg, with sclerosis or atrophy of the follicular epithelium and of the surrounding structures. Or many follicles may be distended, giving the ovary almost a honeycomb appearance when cut open. It may be as large or larger than a goose egg.

Advanced stage.
Destruction.
One or two affected.
Many affected.

Suppuration or *ovarian abscess* has been described in connection with salpingitis (chap. x, par. 11). Abscesses are also formed without participation of the tube, the infection entering by way of the lymphatics.

With salpingitis.
Without salpingitis.

Endometritis is a frequent complication of long-standing cases.

Endometritis.

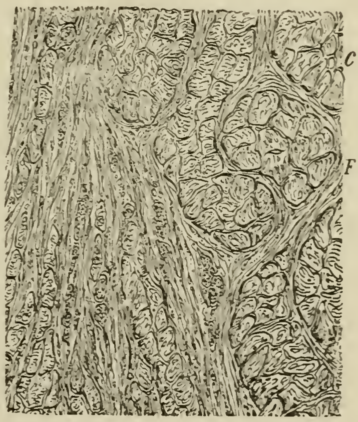


Fig. 237.—Benign Ovarian Endothelioma. (*M. Dixon Jones*)
C. Fully developed convoluted formation. *F.* Fibrous connective tissue.

Gyroma, according to Mary Dixon Jones, consists of transformed corpora lutea vera or those of pregnancy, or of obliterated and transformed blood-vessels. They are convoluted, highly refracting bodies that look something like the crumpled wall of a false membranous sac. The author's observation would lead him to consider them the result of exaggerated hemorrhage into the corpora lutea, or an extravasation about dilated blood-vessels, with subsequent changes due to the inflammation and imperfect absorption. Dr. Jones maintains that the hemorrhage is secondary to the gyroma. Those arising from corpora lutea are peripheral; those from the blood-vessels more central. They may be single or multiple, and may occupy more space than the ovarian tissue itself, producing an apparent increase in size of the ovary.

Benign endothelioma consists of accumulations of endothelial cells, brown fat globules, and pigment cells in closed spaces bounded by connective-tissue fibers (M. Dixon Jones). The formation is surrounded by numerous blood-vessels. It is a development within the walls of the follicles from the endothelium of the blood-vessels. The author would consider this condition to be an exaggeration of gyroma, in which a single large blood-clot or hematoma of the follicle undergoes partial organization. Benign endothelioma is usually single, and may occupy the whole ovary. See Endothelioma of the Ovary (part X, chap. IV, par. 6).

4. **Etiology.** The majority of cases of *acute oophoritis* are the result of surface infection from the Fallopian tube. The ovaries may also become infected by way of the lymphatics, from a lacerated and suppurating cervix or vaginal wall, from an abscess in the pelvic connective tissue, from an appendicitis, or from rectal ulceration. It may also be caused by ovarian hyperemia or hemorrhage, or from certain forms of blood-poisoning, as septicemia, the eruptive fevers, and poisoning by minerals such as phosphorus and arsenic.

Surface infection.
Lymphatic.
Hyperemia.
Blood-poisoning.

5. The *chronic forms* may result from the acute forms, or may occur without any apparent acute stage from repeated hyperemia or from infection. The disturbances connected with dysmenorrhea, particularly of the mechanical and membranous varieties, and in fact almost any serious disturbance of the pelvic circulation acting during menstrual congestion, tend to produce the disease. Chronic metritis and chronic dysentery are examples. Retroversion, prolapse of the ovary, fibroid tumors, ovarian tumors, and syphilis are sometimes responsible.

Acute forms.
Hyperemia. Infection.
Dysmenorrhea, etc.
Chronic metritis, etc.
Retroversion, etc.

As predisposing causes may be mentioned excessive or unnatural venery, sedentary occupations without rest during the menstrual period, and close application to studies and social duties during and after the age of puberty, with an insufficiency of out-of-door exercise.

Venery.
Sedentary occupations, etc.

Distention of the sigmoid flexure by feces and varicocele of the broad ligament probably have something to do with the increased frequency of ovaritis on the left side.

6. **Symptoms.** The most noticeable symptom is persistent pain in one or sometimes both iliac regions, that may extend up over the crest of the ilium, into the hip or down the limb, or into the rectum or bladder. It is made worse by standing or walking, and by the approach of the menstrual period, and is apt to be more or less alleviated by the flow.

Pain.

Aggravated.

Alleviated.

In the earlier stages, menstruation is apt to be increased or prolonged ; in the later stages, diminished, or even permanently suppressed.

Menstruation.

When the inflammation is severe and accompanied by hematoma, gyroma, and endothelioma, then digestive disorders, constipation, palpitation of the heart, anemia, neurasthenia, hysteria, emaciation, and sofa-invalidism are frequently observed.

General symptoms.

Sterility is quite common, but usually depends upon the lesions in the uterus or tubes that are so often present.

Sterility secondary.

In very chronic cases the symptoms of the accompanying endometritis may overshadow those of the primary oophoritis.

Endometritis.

In opening the abdomen for the treatment of diseased ovaries, I have noticed that the pains are frequently on the side the *less* affected, but in a state of more *recent* inflammation.

7. **Diagnosis.** The ovary is felt beside or behind the uterus, is tender to the touch, and if adherent can not be moved about by bimanual manipulation. It is somewhat of the shape of a flattened olive, and more or less lobulated. If not adherent, the ovary recedes when touched, but the ovarian ligament can be felt bimanually connecting it with the uterus. An enlarged tube is usually longer and more closely connected with the uterine horn.

Position.

Tenderness.

Restricted motion.

Shape.

Ligament.

8. **Prognosis.** A perfect cure seldom takes place. In many cases the general health suffers seriously and for a long

time, or until the cessation of ovulation. In others, as the disease becomes more chronic, the suffering ceases and the patient is symptomatically cured. Death seldom results, although in a few cases the protracted suffering wears the patient out.

9. The **treatment** of *acute* oophoritis uncomplicated by salpingitis is the same as that recommended for salpingitis (chap. XI, par. 8); otherwise it is the same as for hyperemia of the ovary (chap. XIII, par. 5).

Indications.

The treatment of *chronic* oophoritis consists in relieving pelvic congestion, separating adhesions, supporting the pelvic organs, removing all sources of irritation, and improving the general health of the patient.

Douches, etc.
Tamponade.
Pessary.
Massage.
Existing diseases.
Iodin.
Rest, etc.
Hygiene.
Change.

Hot vaginal douches, scarification of the cervix, and laxatives relieve congestion. Vaginal tamponade as recommended for mechanical support (part I, chap. IV, par. 11), Thomas' retroversion pessary with thick posterior arm, and pelvic massage (see treatment of prolapse, part VI, chap. V, par. 11) help to support the parts. The treatment of existing diseases of the uterus or tubes, the daily application of tincture of iodin over the iliac regions, the avoidance of sexual excitement or intercourse, rest in the recumbent position during the menstrual periods and for two hours in the middle of each day between periods, and restriction of exercise or occupation so as to avoid producing pain in the parts, are beneficial in relieving and preventing irritation. General massage, Swedish movements, sponge baths, light calisthenics, moderate walking, tonics (part I, chap. V), aid in improving the health. Some patients require a change of climate, or relief from studies, or from the excitement and strain of social obligations.

10. When adhesions exist they should be separated by massage, by manipulation under anesthesia (part VI, chap. IV, par. 8). If that affords no relief, they may be separated by abdominal or vaginal section, or, if the ovaries are badly

diseased, they may be removed (see part VII, chap. XI, par. 11, 12, and 13).

In case one ovary and tube be sound they should be left, and the uterine cavity, if unhealthy, should be treated until cured, in order to avoid infection of the remaining tube and ovary from that source. It is possible in some cases to resect the diseased area of an ovary, and thus leave a portion to preserve the sexual characteristics and make subsequent impregnation possible. (Polk, A. Martin.) In some cases, on the other hand, the nervous symptoms are so great about the menstrual periods that it may be desirable to remove both ovaries in order at the same time to arrest menstruation. Oophorectomy for this purpose has been called *castration*. (Hegar.)

CHAPTER XV.

GONORRHEAL INFLAMMATION.

1. **Pathology.** Gonorrheal inflammation is due to an infection caused by the gonococcus of Neisser. The disease affects primarily the mucous membranes, and by preference those covered by cylindrical epithelium (Bumm). The squamous epithelium of the healthy adult vagina and vulva is ordinarily capable of resisting the infection; that of children is more susceptible to its influence. The urethra, cervix, corpus uteri, and Fallopian tube are the parts most often affected, and in the order named.

Gonococcus. Mucous membranes. Vagina and vulva. Urethra, etc.

The infection spreads along the surface of the mucous membranes until it reaches the peritoneum, although its progress may be checked at the vaginal entrance, the tubo-uterine orifice, or the sphincter vesicæ.

Spread of the infection.

2. The round-cell infiltration, in the acute stage, may extend beneath the mucous membrane even to the peritoneal surfaces and into the pelvic connective tissue. The gonococci are found within the cell protoplasm of the pus cells,

Infiltration. Gonococci.

on the epithelial cells, and in the upper layers of the connective tissue of the mucous membrane, but seldom any in the cell protoplasm. When, however, the mucous membrane becomes abraded or is previously diseased, or when the infection becomes active during the puerperium, the germs may penetrate the parenchyma of the organs (Madlener), or even

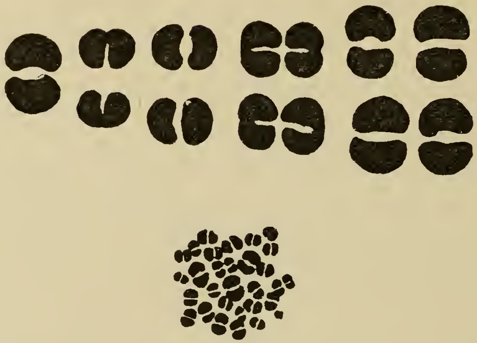


FIG. 238.—SHAPE AND GROWTH OF THE GONOCOCCUS. (*Bumm.*)

Previous disease, etc.

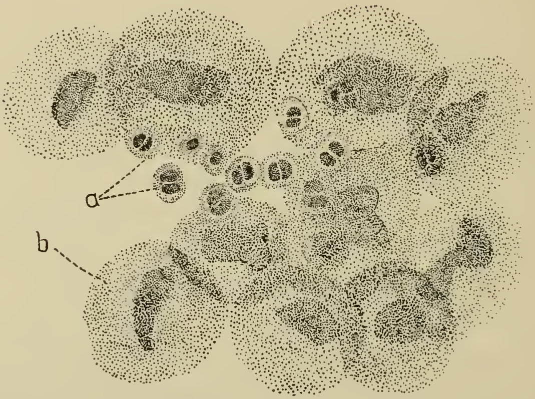


FIG. 239.—GONOCOCCI FROM CASE OF PUERPERAL SEPSIS. (*Prepared by Evans from Burr's case.*)

a. Gonococci surrounded by a capsule of homogeneous protoplasm. *b.* Epithelial cells.

pass through the lymphatics and blood-vessels to distant surfaces, such as the joints, heart, etc.

In some instances the streptococci, or other germs, are found with the gonococci, producing a mixed infection, and aggravating the pathological conditions. During the acute stage, however, the gonorrheal germs seem to destroy or exclude, to a large extent, other germs, their power to do so decreasing as the acute stage passes into the chronic.

Mixed infection.

Acute stage.

Bumm gives the following typical description of the invasion of the gonococcus, as observed upon the conjunctiva: The germs rapidly penetrate the epithelial layer, separate and displace the cells, sometimes cause their exfoliation in flakes, and exceptionally produce a false membrane. At the same time there is an abundant extravasation of white blood-corpuscles in the upper layers of the connective tissue of the mucous membrane. The germs are found in the periglandular spaces, in the lymph spaces, and in wandering pus cells.

Conjunctiva

Penetration.

Cells.

Extravasation.

Location of germs.

Soon a regeneration of the epithelium takes place, and the spread of the germs in the tissue is checked. The newly formed epithelium is of the pavement variety and proliferates rapidly, confining the fungi to the superficial layers. They may be thrown off and disappear with these epithelial cells, and the parts then return to their normal condition, or fresh irritation or traumatism may loosen the epithelium and render a fresh invasion possible.

Regeneration.

New epithelium.

Normal condition.

Fresh invasion.

3. The discharge is at first scanty in amount and mucous and sticky in character, but it increases in quantity and assumes the nature of a thick mucopus, and finally becomes somewhat thinner and distinctly purulent, or seropurulent. In the chronic stage the discharge may become a clear mucus.

Discharge.

Changes.

Mucus.

4. Gonorrheal *vulvitis* presents the changes of simple vulvitis (chap. 1), with a purulent discharge containing gonococci. The acute stage passes off in a few days, and the parts may pass through a short subacute stage and return to a

Simple vulvitis, etc.

Return to health.

Follicular inflammation.

healthy condition. Or a mild but persistent form of follicular inflammation may remain about the vestibule for a long time or indefinitely, with small red spots or patches of inflammation surrounding the tiny mouths of the glands.

Papillomatous growths.

Papillomatous or warty growths (condylomata) formed by hypertrophy of the papillæ may form in groups or isolated masses on the vulva and surrounding skin. They may be hard or soft, flat or pedunculated, or extend in flat ridges.

Gland. Discharge. Occlusion. Staphyllococcus. Abscess. Gonococcus. Distention. Mixed infection.

5. The *vulvovaginal ducts* are apt to be affected at the same time, and in them the disease persists for a long time, the gland itself being seldom infected (Bumm). The discharge may retain its purulent character, or become quite clear and finally lose its specific nature. When the external orifice becomes occluded by inflammatory thickening, the duct may be distended with pus to the size of a hazelnut or larger. The fluid either is expelled at intervals, or may become infected with the staphylococcus aureus, ulcerate its way out through the labium, or into the surrounding connective tissue, and give rise to labial abscess (chap. 11). The gonococci may have disappeared. As a final result of occlusion of the duct, the gland itself may be distended with a clear, sterile mucus, or an indurated nodule may occupy the site of the gland. Infection of the gland proper is usually a mixed infection (Bumm).

Follicles. Induration. Lumen. Follicular inflammation.

6. The *urethra* exhibits the characteristics of acute gonorrheal conjunctivitis (par. 2), with rapid development of the characteristic discharge. The follicles about the meatus become infected. Some peri-urethral induration, with more or less diminution of the lumen or stricture, as well as some chronic follicular inflammation, are apt to remain after the acute stage has subsided.

Neck of bladder. Bladder, etc.

The inflammation occasionally passes the neck of the bladder, since it and upper urinary passages have been found infected in a few instances (Wertheim).

7. Acute gonorrheal *vaginitis*, although of occasional occurrence in children, in old women, and during pregnancy and the puerperal state, is not so often observed in adults. When it occurs it may not be discovered, but when found it is usually situated in the vaginal vaults. In chronic gonorrhea of the genital tract the vagina is almost invariably free from the disease.

Age. Pregnancy, etc. Unnoticed. Vaginal vaults. Chronic.

The changes are more pronounced than those of simple vaginitis (chap. III). The papillæ are larger and more vascular, but the abundant round-cell infiltration about them diminishes their projection, and may even cause them to disappear from view. The epithelium, as the disease progresses, becomes loosened, the cells more or less separated, and covered with tissue débris or with pus cells containing gonococci.

Changes. Papillæ.

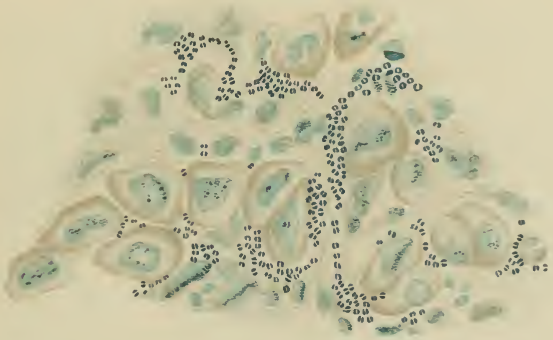


FIG. 240.—GONOCOCCI IN THE EPITHELIAL LAYER OF MUCOUS MEMBRANE OF THE BLADDER. (*Wertheim.*)

Infiltration. Epithelium. Cells.

A chronic granular vaginitis sometimes follows the acute attack.

Papillary growths of a soft, villous character, and deep red, may hang from the vaginal walls or extend along the surface to the fornices.

8. The early changes in the *corporeal endometrium* are those in acute metritis, viz.: infiltration of the interglandular tissues and uterine walls with leukocytes. In eighteen extirpated gonorrheal uteri Wertheim found hyperplasia of the endometrium and underlying uterine walls, and in places a transformation of cylindrical into layers of squamous epithelium. The gonococci were found in irregular masses over the surface, extending in small streams between the epithelial cells to the subepithelial connective tissue, where they existed in great abundance. None were found in the deeper areas of the connective tissue. After a time the gonococci may disappear and a chronic endometritis remain.

Acute metritis.

Hyperplasia.

Epithelium.

Gonococci.

Connective tissue.

Similar changes take place in the *cervical canal.* The fungi penetrate to the connective tissue of the mucous membrane and excite a profuse flow of leukocytes, which force their way through the epithelial layer. This is entirely wanting in places, and in others is transformed into the squamous variety. The glands are seldom infected (Bumm).

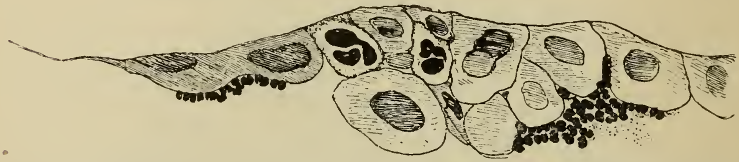


FIG. 241.—SUPERFICIAL LOCATION OF GONOCOCCI ON THE MUCOSA IN CHRONIC GONORRHEAL INFLAMMATION OF THE CERVICAL CAVITY, SQUAMOUS EPITHELIUM TAKING THE PLACE OF THE NORMAL CYLINDRICAL. (*Bumm*)

Penetration.

Epithelial layer.

Glands.

In *chronic* gonorrhea of the endometrium, both corporeal and cervical, the parenchyma presents a normal appearance microscopically, excepting an unimportant round-cell infiltration or hyperplasia about the blood-vessels. The cervical mucosa shows microscopically round-cell infiltration under the epithelial layer. The epithelial layer is intact, and the remains of cilia are apparent. The gonococci are found only in isolated places where the cylindrical epithelium is

Parenchyma.

Blood-vessels.

Cervical mucosa.

Epithelium.

Gonococci.

supplanted by the squamous variety. The cylindrical cells seem to acquire an immunity to the germs that are present. Immunity.

The endometrium also shows localized areas of infection Areas. about which there is decided interglandular round-cell infiltration. In places there is glandular proliferation. The Infiltration. Glands. epithelium over the infected portions consists of a single layer Epithelium. of flat, or of multiple layers of polymorphous or of squamous cells, and is infiltrated with leukocytes. The fungi are found Fungi. in the superficial layers of the connective tissue, and do not penetrate deeply into the glands.

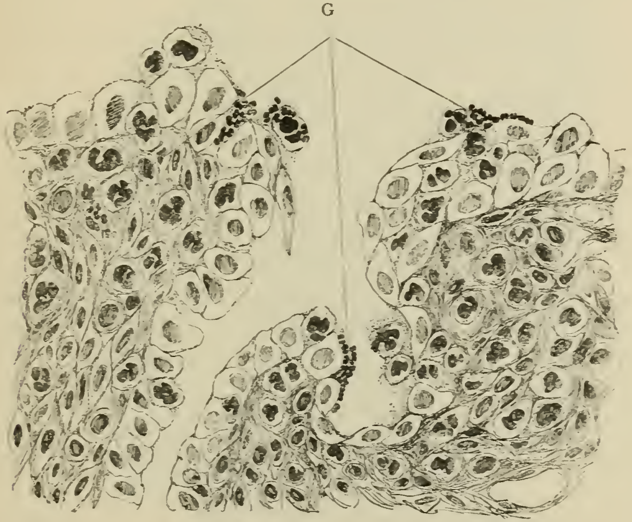


Fig. 242.—Chronic Gonorrhea of the Endometrium. (*Bumm*)
G. Mouth of utricular glands with colonies of gonococci in the epithelium and submucous connective tissue.

9. Gonorrheal *salpingitis* is found in a small percentage of Percentage. cases of gonorrheal endometritis, although it constitutes the majority of the cases of purulent inflammation of the tube of Majority. non-puerperal origin.

The early pathologic changes are presumably of catarrhal Early changes. salpingitis, although somewhat more pronounced.

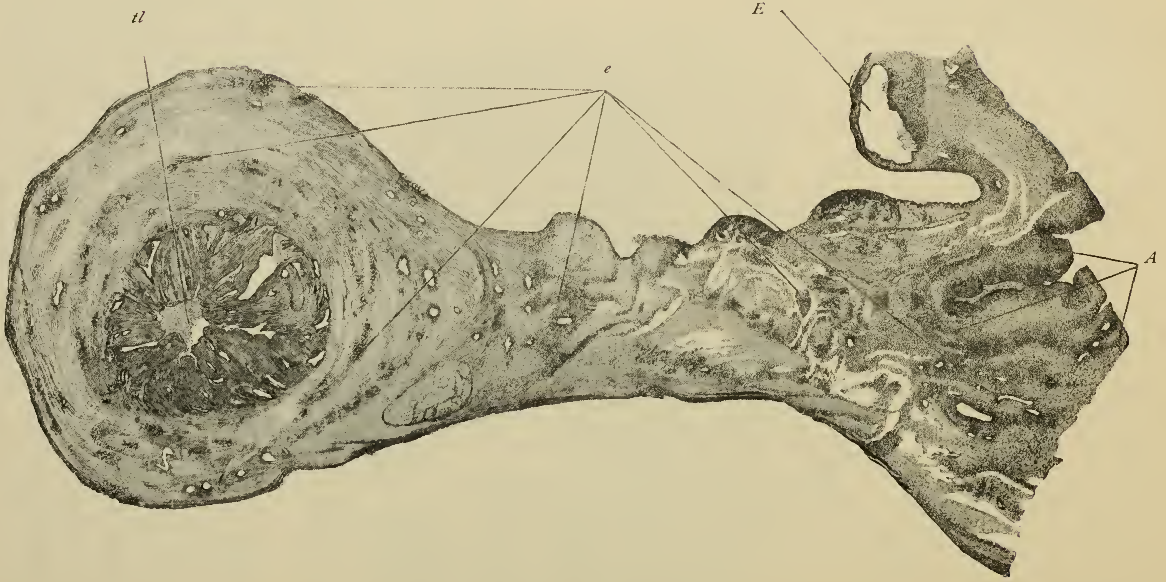


Fig. 243.—Gonorrheal Tube, Inflamed Broad Ligament and Wall of Ovarian Abscess. (*Wertheim.*) *tl.* Lumen of the tube, opened. *A.* Wall of the abscess. *E.* Normal follicle. *e.* Accumulations of pus cells.

Epithelium. Mucous folds. Cells. Infiltration, etc.

As the disease progresses the epithelium is exfoliated in places, particularly on the tips of the mucous folds, which are mostly thicker and shorter than normal. Flat, polymorphous and cubic epithelial cells, infiltrated with leukocytes, are mixed up on the exfoliating surfaces. The round-cell infiltration and hyperplasia affect the folds most intensely, but may extend throughout the tubal walls. Loss of the peritoneal epithelium, and fibrinous exudation upon the serous surface, are common. The gonococci have usually been found in the superficial epithelial layer, and occasionally in the connective tissue of the mucosa.

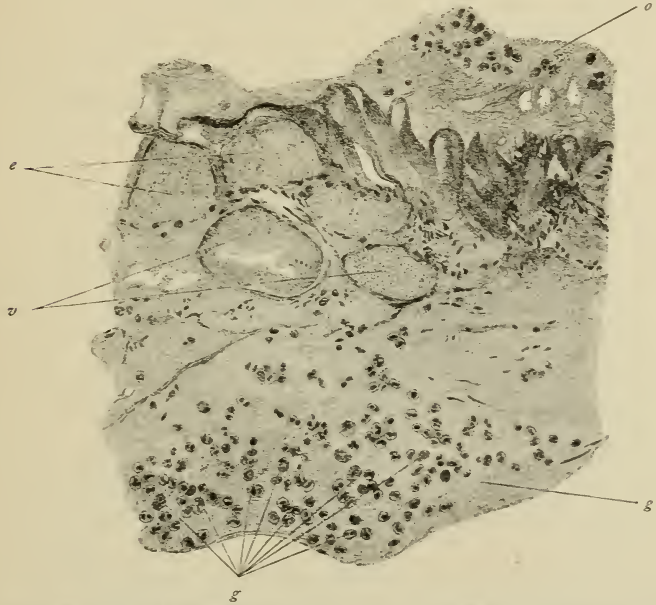


Fig. 244.—One of the Accumulations of Pus Cells (*e.* from Fig. 243) under the "Intact" Peritoneum, with numerous Gonococci within the Pus Cells. (*Wertheim.*)

o. Pus cells upon peritoneal surface, containing gonococci. *e.* Extravasations of blood. *v.* Veins. *g, g.* Masses of pus cells deep in the tissues, containing gonococci.

Endothelium. Exudation. Gonococci.

In one case, operated upon three months after infection, Wertheim found the entire tubal wall, including the peritoneal surface, infested with gonococci. Since but few acute cases are operated upon, it is possible that such deep invasion may often be present in the acute stage, while the germs later die off and disappear from the deeper structures. They are seldom associated with other pus germs.

Chronic cases. The gross changes in the tube resemble, in chronic cases, those of purulent salpingitis already described (chap. x), pyosalpinx, or sactosalpinx purulenta, with disappearance of the fungi, being a frequent result. Nodular salpingitis (chap. x, par. 5) is supposed to be one of the chronic forms (Schauta).

Disappearance.

Nodular salpingitis.

One or both. Both tubes may be diseased, or one may be in a more advanced stage than the other, or only one may be affected.

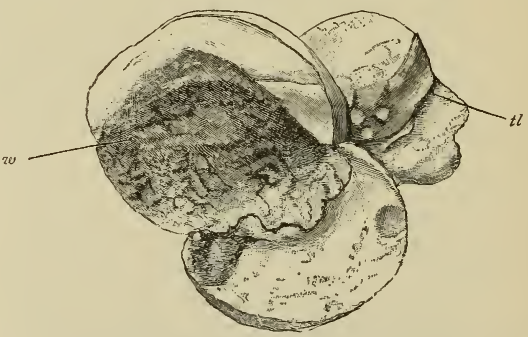


FIG. 245.—GONORRHEAL ABSCESS OF THE LEFT OVARY. (*Wertheim.*)
tl. Lumen of the tube, opened. *w.* Wall of the abscess.

Route.

10. The gonococcus has been found in *ovarian abscess* and also in *ovarian tissue.* Infection may pass from the tube directly to the ruptured ovisac, or along the peritoneal surface, or through the peritoneum and lymphatics, or possibly through the tubal walls and mesosalpinx.

Less extensive, etc.

11. Pelvic *peritonitis* and *adhesions* occur the same as in pelvic peritonitis from other germs, but the inflammation when of pure gonorrheal origin is, as a rule, less extensive and less severe than that of the streptococcus or staphylococcus.

Cause.

12. Gonococci are occasionally found in the *pelvic connective tissue* (Wertheim). Whether the cellular invasion is the

result merely of unusual virulence of the germs, or of accidental conditions diminishing the vitality or destroying the integrity of the tissues, is an unsettled question. Ordinarily they occur only in the superficial connective-tissue layer of the mucosa, and soon disappear from it. Cellular pelvic abscess following gonorrhea may be a mixed infection. Superficial. Mixed infection.

13. Gonorrheal *proctitis* has been observed in quite a number of cases, and fissures, ulcers, rectal strictures (Sänger), ischiorectal abscesses, and anal fistulæ may follow it. Frequency. Results.

14. **Etiology.** The cause of gonorrhea is the presence of the gonococcus, the attack always beginning as an acute inflammation. When the disease becomes chronic the genital tract may become proof against further acute infection from the pus present, although when the latter is inoculated upon the healthy mucous membrane of another individual, or elsewhere in the same person, the germs may resume their virulence and an acute attack follow. Or fresh germs from another person coming in contact with the genital mucous membranes of a person thus immunized to his own gonococci, will produce an acute infection. Husband and wife may, after a series of reciprocal inoculations, become immunized to each other's germs, but remain susceptible to those of a third party (Wertheim). Gonococcus. Relative immunity. Renewed virulence. Fresh germs. Husband and wife.

15. The *manner* of infection is by inoculation—either by coitus or other forms of contact—of infected material upon the mucous membrane genitals, a local lesion not being essential to the process. Inoculation.

When the disease has for a long time been almost cured, and the gonococci can not easily be found, irritation of the parts may bring on a purulent discharge containing the fungi in great abundance. Thus, the newly married man who has been imperfectly cured is apt to experience a return of the evidences of the disease during the honeymoon, and to inoculate his wife. Irritation. Return.

The gonococcus is a fungus of rapid propagation, but of low vitality. Cultures die out in a few days (Bumm). They live only a few hours in sterilized water. On the other hand, the fresh, moist secretion is exceedingly contagious, and the infection of the vagina of young children by the carelessness of diseased mothers is not uncommon. In closed cavities in which there ceases to be a renewal of the secretion the fungi lose their vitality within a few weeks, but on secreting surfaces they retain their vitality almost indefinitely, and may be present in the epithelium for a long time after an apparent cure has been effected.

Unnatural coitus. Auto-inoculation.

Gonorrhea of the *rectum* may arise as the result of unnatural coitus, or from auto-inoculation from scratching, using toilet paper, etc., when the perineum is not kept clear of infected discharges.

Time. Urinary symptoms. Heat about vulva, etc. Moderate. Severe symptoms.

16. *Symptoms and Course.* The symptoms commence within twenty-four to forty-eight hours after exposure to the contagion. An itching in and about the urethra is noticed, which is apt to be accompanied by an increased desire to urinate. Very soon a sensation of heat is felt about the vulva, which is increased to that of a burning or scalding when the urine is passed. In most cases the tenderness and distress are moderate, but occasionally they give place to a throbbing pain that is increased by walking or other motion of the limbs, or by the slightest touch of the finger.

Beginning. Subjective symptoms. Pus. Objective. Hymen, etc. Children, etc.

Upon examination in the beginning there is merely a reddening and moderate swelling and tenderness of the urethral orifice, from which a drop of thick mucus or mucopus can be pressed. After the subjective symptoms have lasted for a day or two, the entire urethra and the parts about the orifice become intensely red and markedly swollen and sensitive, and an abundance of pus, and sometimes of pus and blood, can be pressed out by the finger introduced into the vagina. The hymen and parts about the vestibule usually show the signs of moderate irritation. In children, and occasionally in adults, the hymen, vestibule, and labia become swollen, edematous, and eroded, and covered with infected pus and false membrane, and the inguinal glands tender and swollen. In neglected cases an eczematous dermatitis supervenes, with crusts, and the development of a disagreeable odor.

False membrane. Glands. Dermatitis.

After the third or fourth day the discharge becomes quite abundant, and, when the acute distress subsides, becomes, as a rule, the most noticeable symptom. The vulva may be of normal appearance in two weeks, but the urethral redness and pyorrhea continue for three or four weeks.

Discharge. Vulva. Urethra.

The follicles about the vestibule may become infected even when there is no general vulvitis. They give the appearance of isolated or numerous kernels or spots, out of which pus can be pressed. The suppuration subsides slowly and for a long time, and sometimes almost indefinitely, small red spots remain to indicate the location of the mouths of the follicles.

Follicles. Appearance. Suppuration. Mouths of follicles.

17. Infection of the *vulvovaginal glands* is a frequent, although not usually an early, manifestation. The orifices are reddened, and give exit to quite a quantity of greenish-yellow pus when the enlarged duct is pressed upon. In the later stages the discharge often changes to a turbid or clear serum, and a small red area about the orifice may be the only ocular evidence of the remains of the disease. Retention and abscess formation occur in about one-third of the cases, and usually only on one side. In others, a filling up of the duct or gland, with formation of an elastic tumor on the inner aspect of the pubic rami, and a periodic evacuation through the duct, are the only annoyances left.

Frequent, etc. Orifices. Discharge. Later stages. Retention. Abscess. Tumor. Periodic evacuation.

Retention of pus, followed by ulceration, and discharge through the inner side of the labium or into the cellular tissue and the formation of labial abscess, takes place in about one-third of these cases. Obstinate fistulæ are apt to result.

Ulceration. Labial abscess. Fistulæ.

18. Infection of the *vagina* is signalized by moderate fever, a burning sensation in the parts, dull pain in the pelvis and back, some suprapubic tenderness, and pain upon walk-

Subjective symptoms.

Objective. ing, coughing, etc. The vaginal membrane is exceedingly tender to the touch, and swollen, smooth, and velvety in appearance. It bleeds easily, is eroded in places, and is covered with gonorrheal pus that is apt to stagnate and smell bad.

Duration. The disease runs its course in about three weeks, the improvement beginning in a week or ten days. During the Gonococcus. height of the inflammation the gonococcus is present in the pus almost to the exclusion of all other micro-organisms, the Other germs. ordinary vaginal germs reappearing as the disease subsides.

Gonococci are seldom found in the epithelium or secretions of chronic vaginitis. Some vaginal redness and tenderness is apt to be present in gonorrhea of the genital tract, but is more often due to the *irritation* of the secretions from the parts above rather than to infection.

19. Gonorrhea of the *uterus*, although one of the most common varieties, presents but few symptoms except of Inflammation. inflammation, and these are not always pronounced.

Appearance. The *cervix* is swelled, tender, and shiny in appearance, and the mucous membrane everted. In the early stages an Pus. abundance of greenish-yellow pus flows from the os, and sometimes from the cervical follicles. Later the discharge is Thicker. Mucus. thicker, and may be a transparent mucus.

When the mucous membrane of the *corpus* is infected, the Acute metritis. symptoms are those of acute metritis of moderate severity. First few days. For a few days the patient is quite sick with chilliness, pelvic pains, bearing-down sensations in the bladder and rectum, local tenderness, temperature of 100° to 102° F., and is obliged to lie down most of the time or even stay in bed. Amelioration. After a week the suffering ameliorates, but the abundant Discharge. purulent discharge continues.

Symptomless. Chronic gonorrhea of the cervix may be symptomless a large part of the time, and is chiefly noticeable for its Exacerbations. exacerbations. The cervical mucous membrane may remain everted Eversion. Erosion. and show the signs of follicular erosion.

Chronic gonorrhea of the corpus uteri does not usually differ symptomatically from chronic metritis.

Metritis.

20. Gonorrheal *salpingitis* begins with the symptoms of catarrhal or purulent salpingitis (chap. X, par. 14 and 15) which follow those of acute or chronic gonorrheal metritis. They may, after a few weeks, entirely disappear, or may run into those of chronic interstitial salpingitis and sactosalpinx (chap. X, par. 16 and 17). The peritoneal symptoms, when present, are usually those of mild forms of pelvic peritonitis.

Usual forms following the metritis.
Disappearance.
Chronic.
Peritonitis.

21. Gonorrheal *rectitis* causes an itching or burning and tenderness about the anus, with more or less rectal tenesmus. These may subside and no further symptoms be felt, or the pains and distress of subsequent fissures, excoriations, and ulcerations may come on later. The mucous membrane is swelled, reddened, and shiny, and bleeds easily. The discharge is decidedly purulent but not very abundant.

Itching, etc.
Tenesmus.
Subsidence.
Later results.
Mucous membrane.
Discharge.

The symptoms of the chronic form are those of persistent inflammation, the gonorrheal pus or mucus being found between rectal folds or upon ulcerated surfaces.

Chronic.
Persistence.
Pus.

22. **Diagnosis.** The diagnosis in the early stages depends upon the discovery of the gonococcus in the discharges or in particles of tissue removed. The symptoms, physical signs, the course of the disease, spreading from one part to another, the known fact of exposure to infection, and the absence of other sources, usually serve the purpose in recent cases. In chronic cases the gonococcus is often difficult to find, and may not ordinarily be present in the secretions except during exacerbations. In many instances we have to deal with inflammations which are the results of previous gonorrheal infection, but which are no longer specific.

Gonococcus.
Symptoms, etc.
Exposure.
Difficulty.
Results.

Usually the remains, or results, of gonorrhea can be discovered in some of the tissues. Thus, a urethritis or a stricture of the urethra, inflammation or occlusion of the duct of the vulvovaginal glands, edematous smoothness of

Remains.
Enumeration.

vulva and vagina, maculæ at mouths of the vulval or cervical follicles, ectropion without laceration of the cervical mucous membrane, persistent and abundant tenacious mucous or mucopurulent discharge, nodular salpingitis not connected with tuberculosis, endometritis in well-developed nulliparæ, associated with sterility, etc., existing singly or severally, should lead us to carefully examine the secretions or tissues for the gonococcus.

Examine secretions.

Circumstantial evidence.

The fact that the husband has recently had the disease, or is imperfectly cured of an old attack, as well as the occurrence of ophthalmia neonatorum, or of purulent vulvitis in a younger member of the family, confirms the diagnosis.

Method of examining secretion.

23. The secretion may be examined in the following manner for the gonococcus: A drop is compressed to a thin layer between two slides. These are then separated, well dried, and placed for five minutes in a dilute solution of carbolfuchsin, thoroughly washed off with water, and dried again. They can be immediately examined (oil immersion), and be preserved by putting Canada balsam upon the preparation and covering it with a glass (Bumm). Löffler's solution of methyl-blue affords a satisfactory stain, but must be kept in contact for half an hour. (See small type below for a more thorough examination.)

Löffler's solution.

Cultures.

Cultures from the discharge may be made in serum tubes: equal parts of human blood serum and a watery solution of two per cent. agar, one per cent. peptone, and half of one per cent. sodium chlorid (Wertheim), which in forty-eight to seventy-two hours yield large colonies of well-developed gonococci for microscopic examination.

Acute stage.

Chronic.

In the acute stage, the large number of gonococci in the pus cells, and the scarcity of other fungi, renders their recognition easy. In the chronic stage other fungi may be present, but the large size and characteristic arrangement in groups distinguish gonococci.

The following is a more detailed and reliable method of examination, such as is employed by Dr. Evans in the laboratory of the College of Physicians and Surgeons of Chicago.

The pus should be absolutely fresh. When it is possible a thoroughly cleansed slide should be touched to the pus as it exudes from the parts. Then spread in a thin layer with another slide or a wooden toothpick. The slide is dried in the air, then passed through the flame three times with the pus side up. Prepare at least six slides in this way. On two of these place a watery solution of methylene-blue for five minutes, wash in water, dry in the air. When thoroughly dried, put on a drop of clearing oil and examine without a cover glass. If the biscuit-shaped cocci are found in the characteristic clumps, then proceed to verify this by Gram's method: Take four slides, dried in the air and passed through the flame as before, stain for two minutes in a solution of gentian-violet in analin-water, two minutes in potassium iodid solution (one part iodin, two parts iodid, and 300 of water), then in absolute alcohol until the color is a faint gray; clear two slides in clove oil and examine under immersion lens; the other two slides are to be stained for one and oneh-alf minutes in a watery solution of eosin, washed in water, dried, and examined under immersion lens. The characteristic biscuit-shaped diplococci, or clumps around the cell nuclei, can

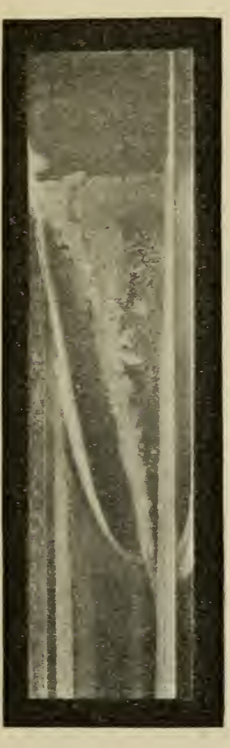


FIG. 246.—CULTURE OF GONOCOCCI IN PEPTONE-AGAR AND HUMAN BLOOD SERUM, TWENTY-FOUR HOURS OLD. (*Wertheim.*)

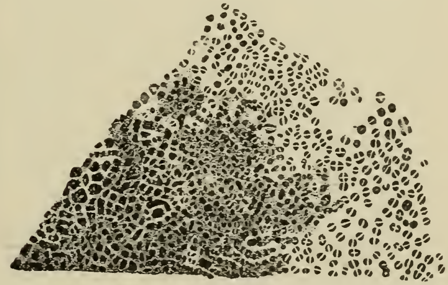


FIG. 247.—SECTOR FROM THE EDGE OF A SUPERFICIAL COLONY OF GONOCOCCI AFTER SEVENTY-TWO HOURS. (*Wertheim*)

not be seen in the specimens stained by Gram and not counterstained by eosin. All streptoccoci, staphylococci, and pneumococci will show blue. The two slides stained with eosin will show streptococci, staphylococci, and pneumococci blue, and gonococci red.

Variable.

Mild cases.

24. The **prognosis** is variable. In the so-called mild cases the disease is apt to remain confined to the external genitals, or even if it reaches the Fallopian tubes may entirely disappear and leave the parts in an approximately healthy state. In severe attacks, however, every portion of the genital tract may in turn be affected, and some parts, particularly the uterus, may retain the fungi almost indefinitely, ever ready under favoring circumstances to reinfect the other parts. In chronic cases the condition of the general health may be impaired.

Severe attacks.

General health.

Frequency.

Ovum.

Puerperium

Sterility results in more than one-half of infected women. The ovum may find no resting-place in the uterus, or early abortion may take place. Preëxisting gonorrhea seldom disturbs the first two weeks of the puerperium, but during the following weeks there is a marked tendency of the germs to assume renewed virulence and invade the healthy parts (Sänger), passing either from the cervix to the uterine cavity or from the uterine cavity to the tubes.

Resistance of vagina.

Urethra.

Restriction.

Cervix.

Coitus, etc.

25. **Treatment.** As the vaginal epithelium is not easily infected by the gonococcus except under the influence of traumatism or other influences that abrade it or alter its character, a gonorrhea of the urethra will, in the majority of cases, restrict itself to the external parts, unless an additional inoculation of the cervix has taken place. Hence, the first item in treatment is to prohibit coitus as well as the introduction of foreign bodies into the vagina for five or six weeks, or until repeated bacteriological examination of the secretions prove that the gonococci have disappeared. At the same time the husband should be thoroughly treated to avoid a subsequent infection which may then attack the cervix.

Disappearance of gonococcus.

Husband.

Disinfection. Examination. Cervix. Vaginal walls. Let alone.

When the case is first seen, the vulva should be thoroughly washed off and disinfected with a 1 : 1000 solution of argentamin or silver nitrate, and a speculum examination be made. If the cervix does not show signs of the disease, the vaginal portion and the vaginal walls should be thoroughly disinfected with the same solution as the speculum is being withdrawn, and the vagina be let alone thereafter.

Papillary growths.

Papillary or warty growths are to be treated by attention to cleanliness, sitzbaths, and astringent and antiseptic ointments, such as the oxid of zinc ointment containing ten per cent. of carbolic acid. When this fails they should be cauterized, or be cut off and their base be cauterized.

Diuretics. Sitzbaths.

26. The *urethritis* may be benefited by the administration of diuretics such as the citrates or acetates, or the potassium bitartrate, and copious drinks of water. The resulting abundant and frequent passage of dilute urine assists in cleansing the urethra and eliminating the germs. Plain sitzbaths of half-hour duration should, in the early stages, be taken every two hours if possible, and the vulva be thoroughly washed off half way between the baths and after each urination. The application once or twice daily of a 1 : 1000 solution of argonin acts beneficially.

Sandalwood, etc. Intervals. Local application.

After the local soreness has subsided the oil of sandalwood, or a mixture of oil of copaiba and cubebs, may be given internally. The intervals between the sitzbaths may be lengthened somewhat, and the vulva be washed every two hours with a 1 : 4000 solution of argentamin, silver nitrate, or potassium permanganate.

Chronic urethritis.

Chronic gonorrheal urethritis is treated as has been recommended for chronic urethritis elsewhere (chap. IV, par. 14).

Douches.

27. If the lower end or all of the *vagina* be infected, copious vaginal douches of plain water, as hot as can be borne, every hour and lasting ten minutes, or every two hours and

lasting twenty minutes (preferably the former), may take the place of the sitzbaths (part I, chap. V, par. I), but the vulval washes should be continued every two hours.

Washes.

Astringents and antiseptics.

After the soreness passes away antiseptic and astringent douches will hasten the cure. A 1 : 4000 solution of argentamin or potassium permanganate every two or three hours, and later solutions of twice that strength every four hours, act well. Neglected cases with an abundant discharge are sometimes benefited by the more decidedly astringent douches, such as a one or two per cent. solution of lead acetate, zinc sulphate, or alum.

Neglected cases.

Through speculum.

In chronic cases the application through the speculum of a solution of silver nitrate (one to ten per cent.) every day or two (Bumm) produces rapid improvement. In children the solution is injected through a catheter, and should be mild at first.

Children.

With vaginitis.

28. Acute gonorrhea of the *cervix* in connection with an acute vaginitis should receive only the treatment appropriate for the latter. After the vaginitis has in a great measure subsided, or if the cervicitis originates without infection of the vagina, then as soon as the swelling and tenderness of the cervix have abated, the external os should be kept widely dilated by bougies introduced a short distance into the cervix every two or three days. After each dilation the cervix is swabbed out with 1 : 1000 argentamin or nitrate of silver solution. By this means the cervix is drained and is also enabled to derive some benefit from the vaginal douches.

Without vaginitis.

Dilation.

Application.

Drainage, etc.

Chronic cases.

In chronic cases ten per cent. solutions of silver nitrate should be used, and the local conditions be treated as recommended elsewhere for chronic cervical endometritis (chap. VII, par. 11 and 12).

Danger.

29. Since the greatest danger of gonorrhea of the *endometrium* is infection of the tubes, and as that only takes

Percentage. No call for local treatment. Rest, fomentations, etc. During first week.

place in about ten per cent. of the cases, there is no call for an energetic local treatment of the uterus during the acute stage, for the increased irritation is liable to bring about an invasion of the tubes. Rest in bed, hot fomentations over the abdomen, copious hot vaginal douches, and saline laxatives meet the main indications during the first week, when there is soreness, tenderness, and more or less elevation of temperature.

Dilation. Applications. Chronic stages. Tamponade.

After that the internal os should be gently and progressively dilated with sounds, and the endometrium swabbed out with a 1 : 1000 solution of argentamin, or a fifty per cent. solution of ichthyol in glycerin, two or three times weekly (chap. IX, par. 15). In chronic stages, lysol, 95 per cent. carbolic acid, or a ten or 20 per cent. solution of silver nitrate or zinc chlorid should be used. A tampon dipped in a ten per cent. solution of ichthyol in glycerin should be placed under the cervix at each treatment and be left for eight or ten hours.

With salpingitis.

If there be an acute or subacute salpingitis, the uterine cavity should not be disturbed until it has become chronic, and then only with the mildest treatment.

Catarrhal. In bed longer. Douches.

30. Acute gonorrheal *salpingitis* should be treated the same as catarrhal salpingitis (chap. XI, par. 8), except that the patient must be kept in bed longer. Vaginal douches may have to be commenced, or resumed earlier, on account of the presence of the disease in the lower parts.

The chronic forms are also treated as recommended elsewhere (chap. XI, par. 10 to 15).

When both tubes and ovaries are removed it is most rational to remove also the infected uterus. But in a young married woman, if one healthy ovary and the uterus can be saved, even though both tubes be removed, it may sometimes be better to do so in order to avoid atrophy of the vagina as well as of the sexual nervous system. The uterus can be subsequently cured by local treatment.

CHAPTER XVI.

SYPHILIS AND CHANCROID.

1. The general symptoms and manifestations of *syphilis* are practically the same in both sexes, and require no special description here. The local signs are those which will engage our attention.

Less often on genitals.

2. The *initial lesion* is not so constantly manifested on the genital organs in women as in men, the anus and buccal cavity being in comparison more frequently affected. Occasionally the nipple is the seat of the chancre. The labia majora, fourchette, labia minora, the clitoris, the skin on the pubes and in the groin, and the cervix uteri are the parts most often inoculated, and in the order named. The vagina is seldom the seat of a true chancre.

Parts inoculated.

Vagina.

Characteristics of the chancre.

The sore is, as a rule, single, and possesses the same induration,—sometimes superficial, sometimes deep,—the same attenuation of the epithelial layer or cup-shaped ulceration, the same smooth, false membranous surface, the same slight serous discharge, and the same constitutional infection as that observed on the male genitals. The period of inoculation is from two to four weeks, sometimes longer. A microscopic examination of the tissue shows round-cell infiltration with thickening and sclerosis of the coats of the blood-vessels, both venous and arterial. Extended but painless swelling of the lymphatic glands of the groin, without any tendency to suppuration, is the rule.

Period of inoculation.

Histology.

Glands.

Constancy.

3. *Mucous patches* are the constant attendants of syphilitic invasion of the system unless they have been suppressed by treatment. They represent a papular eruption which has been transformed by heat and moisture, and often aided by friction, into abraded, red, smooth patches on the skin or grayish

Definition.

Discharge. Histology.

sores on the mucous surface. They emit a more or less offensive highly contagious discharge. There is increased vascularity and enlargement of the papillæ, thickening of the epithelium, and proliferation of the dermal tissue.

Seat.

The vulva is the most common seat, although the vagina and the vaginal portion of the cervix and neighboring folds of skin may be infected.

Other secondary evidences.

Warty growths and the exanthemata of the vulva also constitute secondary evidences of syphilis.

Location.

4. *Gummata* and *tubercles* affect most frequently the vulva, although they may appear in the vagina, cervix, and, in rare instances, in the uterine body, Fallopian tube, and on the ovary.

Vulva and vagina. Structure. Tissues affected. Later changes in gummata. Fistulæ.

The vulva may contain only one or two tubercles, or the lower portion of the vagina may be extensively infiltrated with them. They are composed mainly of embryonal cells. Tubercles usually affect the superficial tissues only, while gummata, although similar in structure, invade the connective tissue beneath the surface, causing a breaking-down of the tissue and the separation of a core-like mass. Thus, considerable loss of tissue and cicatricial contraction are apt to result. When the bladder or rectum is similarly affected, perforation into the vagina may occur and lead to vesicovaginal or rectovaginal fistula.

To what due. Dysmenorrhea, etc. Abortion.

5. The **symptoms** are those caused by the local inflammation and suppuration that are present, as well as by interference with the functions of the organs. Among those referable to the latter cause are dysmenorrhea, sterility, and dystocia. Habitual abortion, or the repeated delivery of dead-born children, often result from an infection of the ovum.

Chancre. Difficult at first. Characteristics.

6. The **diagnosis** of *chancre* is difficult during the first week, when the characteristics may not have become apparent. The exposure to infection two or three weeks before its appearance, the location of the sore, its steady development, its

papular character, commencing induration of the glands, desquamation of epidermis or erosion of the mucous surface, with gradual development of the characteristics mentioned in par. 2, enable us to make a probable diagnosis. A definite diagnosis can not always be made, however, until the secondary manifestations upon the skin or mucous membranes make their appearance.

Mucous patches.

Mucous patches are round or oval areas of inflammatory swelling upon which whitish points or patches of macerated epithelium may be found. After these have fallen off or have been removed the surface is red and smooth.

Tubercles.

Dry and ulcerating.

From lupus.

Tubercles appear as flattened areas of induration on the surface, which occur singly or in groups and assume a coppery color. They may be covered with scales and cicatrize without ulcerating, or they may break down and form circular suppurating ulcers. They resemble lupus to a certain extent, but their rapid development, darker color, deeper ulceration, more profuse discharge, and the more regular shape, both of the sore and the cicatrix, as well as amenability to alterative treatment, serve to distinguish them. A true tuberculous ulcer of the vagina is more sensitive than a syphilide, has miliary tubercles on its surface and margins, and does not suppurate as freely. The discovery of tubercle bacilli is, of course, decisive.

Tuberculous ulcer of vagina.

Gummata.

Growth.

Suppuration.

Discharge.

Breaking down.

Gummata begin as small, painless tumors beneath the normal-looking, slightly raised surface. They grow slowly until they are from one to two cm. in diameter, although they may attain to a diameter of five or six cm. After softening and suppuration becomes apparent, the overlying skin or mucous membrane grows red and is soon perforated. The discharge is scanty and purulent or gummy, and the substance of the gumma gradually breaks down into small sloughs and is thus eliminated, often giving rise to a disagreeable odor.

Methods.

7. **Treatment.** The internal treatment consists chiefly in the administration of mercury by the mouth, the skin (inunc-

tion and vapor baths), and hypodermically. In the later stages, moderate doses of potassium iodid may be added, and, in case there be decided evidence of anemia and debility, the specific treatment may be suspended for two or three weeks at a time, during which time tonics are given. When well borne, a third or a quarter of a grain of the yellow mercurous iodid three times daily is a good routine remedy. The condition of the general health should always be looked after.

Later stages.
Tonics.
Mercurous iodid.

When the chancre is discovered and recognized within a few days of its first development, and before the glands have become affected, it should be excised, and the resulting wound be dressed with iodoform powder with the intention of preventing systemic infection. Cauterization with nitric acid is also a reliable method.

Early excision.
Cautery.

After the sore has existed for several days local treatment is of little avail in protecting the system, and is seldom needed for the local condition. When, however, local irritation is present, sitzbaths, one per cent. carbolic vaginal douches, and the application once or twice a week of carbolic acid give relief.

Later local treatment.
Sitzbaths, etc.

Silver nitrate and strong carbolic acid act well upon mucous patches. Those upon the external skin may be dressed with a mixture of carbolic acid and the oxid of zinc ointment, 1 : 10, or with an antiseptic powder. Ulcers may be mildly cauterized with carbolic acid or nitrate of silver and dressed with iodoform or nosophen.

Mucous patches.
On skin.
Ulcers.

As the glands are not tender and seldom suppurate they require but little attention.

Glands

Warts may be treated with a sitzbath two or three times daily and carbolized zinc ointment kept constantly applied. Cautery or excision may occasionally be required.

Warts.

8. **Chancroid** is a venereal sore acquired by inoculation and due to an infection the pathology of which has not been definitely settled.

Definition.

Beginning. Small red spot. Abraded surface.

It may begin as a small red spot from which inflammation is rapidly developed. In twenty-four hours a papule is formed which in another twenty-four hours is converted into a pustule. In another forty-eight hours the chancroid is fully developed. It may also commence on an abraded surface, which is within even less time converted into a broad ulcer.

Fully developed. Edges. Surface. Discharge. Glands. Microscopic appearances.

The fully developed chancroid is a round or oval ulcer which enlarges rapidly. Its edges are perpendicular or excavated. The surface is slightly depressed and has a pitted granulating surface of grayish color. The discharge is profuse and purulent, and is apt to infect the surrounding abraded surfaces and produce other chancroids. Infection of the neighboring lympathics, and suppuration around or even within one of the glands, may result. The microscopic appearances are those of an ordinary ulcer of inflammatory character.

Tenderness, etc. Course. Chronic form. Phagedenic character. Glands.

9. The sore is usually tender, and gives rise to discomfort and itching. It may heal in three or four weeks or become chronic and continue almost indefinitely. The chronic form is, as a rule, less virulent than the acute. Occasionally a phagedenic or even diphtheric character is developed. The inflamed lymphatics are tender and tend to suppurate.

From true chancre. Base, edges, discharge, etc. Auto-inoculable, etc. Constitutional infection. Glands.

10. The differentiation of chancroid from true chancre is important. The base of the former is not indurated, the edges are soft and usually excavated, the discharge abundant and purulent, and the sore is tender and attended by itching or great discomfort. It is anto-inoculable and usually multiple. It does not produce constitutional infection, but may be attended by suppuration in or about a single neighboring gland instead of a painless induration of a series of glands (see par. 2).

Herpes.

Herpetic eruptions begin as vesicles, are not deeply inflamed, are apt to be confluent, do not suppurate profusely, heal more readily, and sometimes recur after having healed. The lymphatics are seldom affected.

11. The *treatment* of chancroid is essentially a local one. When the sore can be recognized in its early stages, strong nitric acid may sometimes be made to completely destroy the affected tissue. After considerable infiltration of tissue has taken place, the acid is liable to be inefficient in its action and may increase the extent of the ulceration. Salicylic acid powder applied once or twice daily (Hebra) shortens its duration. Touching the parts with carbolic acid every day or two often has a gradual curative action in the more persistent cases.

Local.

Cauterization.

Contraindication.

Salicylic acid.

Carbolic acid.

When the strong applications do not act well, or are not permitted by the patient, irrigation two or three times daily with a 1 : 2000 solution of corrosive mercuric chlorid and the constant application of iodoform powder, or, if this sovereign remedy proves too offensive to the patient, of cloths dipped in mild antiseptic solution of boric or salicylic acid, act well. Sitzbaths of half-hour duration three or four times daily are of great benefit in removing the poison and relieving the discomfort.

Irrigation.

Iodoform.

Antiseptic solutions.

Sitzbaths.

PART EIGHT.

GENITAL TUBERCULOSIS.

CHAPTER I.

TUBERCULOSIS OF THE VULVA AND VAGINA.

Frequency. Secondary.

1. Genital tuberculosis is a much more common affection than was formerly supposed. The order of frequency of the organs affected is as follows: the tubes, uterus, ovaries, vagina, cervix, and vulva. (J. Whitbridge Williams.) It is secondary to tuberculous disease elsewhere in from 85 to 90 per cent. of the cases observed.

Two ways. Peritoneum and lymph-channels. Viscera. Circulation. Auto-inoculation.

Primary inoculation, as a rule, occurs through the external genitals (coitus, examinations, etc.), although the disease may in exceptional instances invade these parts by way of the general circulation. *Secondary infection* may take place by way of the peritoneal cavity and the lymph-channels from the abdominal viscera or the urinary organs, or through the general circulation from distant organs, or by auto-inoculation from the secretions.

Excessive sexual intercourse, parturition, and the puerperal state favor the rapid development of the disease. Gonorrheal and other purulent inflammations act similarly. The tubercle bacillus is apt to remain after the pus germs have disappeared.

Lupus.

2. **Tuberculosis of the Vulva.** Lupus is the form usually observed on the vulva, and does not differ materially from lupus affecting the skin elsewhere.

Excoriations.

In advanced cases of tuberculosis of the genital organs the discharge sometimes excoriates the vulva, and gives rise to the development of tubercles in the corium, and to one or more tuberculous ulcers. The ulcer has irregular jagged edges, and a bright red base with indurated base and numerous minute gray or yellow spots faintly visible over it. It is moistened with a purulent discharge.

In corium.
Ulcers.
Edges.
Base.
Spots.
Discharge.

The *diagnosis* is based upon the appearance of the ulcer and the presence of tuberculous disease elsewhere in the genital tract.

Ulcer.
Disease elsewhere.

The *treatment* is extirpation of the diseased tissue and suture of the raw surfaces. If there is doubt about the condition of any of the tissue remaining, it should be thoroughly cauterized.

Extirpation and suture.
Cauterization.

The material for study is so scanty that our knowledge of vulval tuberculosis, excluding ordinary lupus, is unsatisfactory. The case of Emmanuel (*Zeitschr. für Geb. u. Gyn.*, XXIX) was connected with infection of the inner genitals; those of Chiari and Zweigenbaum with vaginal tuberculosis. Primary infection of the vulva probably assumes the form of lupus in nearly all cases.

3. **The Vagina.** The vagina is not easily infected by tuberculosis. When infected, it is usually in the posterior fornix by the discharges from the tuberculous uterus, or by an extension from the cervix. Sometimes, however, the peritoneum, bladder, or rectum, or even a distant organ, may be the source. Maas reports a case secondary to tuberculosis of the umbilicus in an infant.

Resistance.
Location.
Source.
Exceptional sources.

Vaginal tuberculosis commences in the form of miliary tubercules, never larger than a millet-seed, some of which in time undergo caseation, break down, and form ulcers covered by a caseous matter. The ulcers are slightly depressed, and have a granular base of a yellowish or grayish cast. The edges are perpendicular, sharply defined, irregular, and surrounded by a deposit of miliary tubercules forming a red areola around them. Perforations into the neighboring tissues and fistulæ sometimes occur.

Miliary.
Caseation, etc.
Ulcers.
Edges.
Areola.
Perforations.
Fistulæ.

Discharge. Ulcers. Disease elsewhere. Microscope. Inoculation.

4. The *diagnosis* is based upon the grumous discharge containing cheesy particles, upon the appearance of the ulcers, the presence of tuberculosis elsewhere, particularly in the uterus, and microscopic examination, or inoculation of a guinea-pig (chap. II, par. 4).

With recent general vaginitis. Chronic without characteristic.

Granular vaginitis is either connected with recent general vaginitis, or is chronic without showing the characteristic vaginal ulceration or the development of tuberculosis infection elsewhere.

History. Treatment.

Chancres develop and heal more rapidly, and have a different clinical history. Chancroids are differentiated by their rapid development, their yellowish base and bright red granulations, the absence of tubercles or induration about them, and the comparatively quick recovery under treatment.

Microscope. Examination.

A microscopic examination, or an inoculation experiment upon a guinea-pig, is sometimes necessary to distinguish it from epithelioma, which may resemble it.

Excision and cautery. Removal. Palliation.

5. The *treatment* consists in an excision of the tissue and cautery of the base, if the other genitals are not affected. When, however, the uterus and Fallopian tubes are affected, they should also be removed, if possible, unless there be general infection. Curetting and cautery, and subsequent applications of the tincture of iodin or of iodoform, are of palliative value.

CHAPTER II.

TUBERCULOSIS OF THE CERVIX UTERI.

Seldom primary. By way of vagina.

1. Tuberculosis of the cervix is seldom primary, although it may result from infection coming by way of the vagina, from the semen of a tuberculous testicle, or be introduced by the finger, instruments, or other foreign bodies. It usually

occurs in connection with tuberculosis of the posterior vaginal fornix.

Posterior fornix.

It has seldom been recognized in life, although, as in Péan's case, many tuberculous cervices have probably been removed for supposed cancer.

Seldom recognized.

Mistaken for cancer.

2. **Pathological Anatomy.** The first changes *within the cervix* are those of catarrhal inflammation with small miliary tubercles beneath the surface. The folds of the arbor vitæ contain a sticky mucus and show secondary villosities. The subepithelial structures of the cervix are the seat of diffuse round-cell infiltration. In this groundwork of round cells are imbedded tubercular nodules consisting of giant cells, epithelioid cells, and tubercular reticular tissue. When these masses are in the vicinity of glands, the epithelium of those

Catarrhal inflammation.

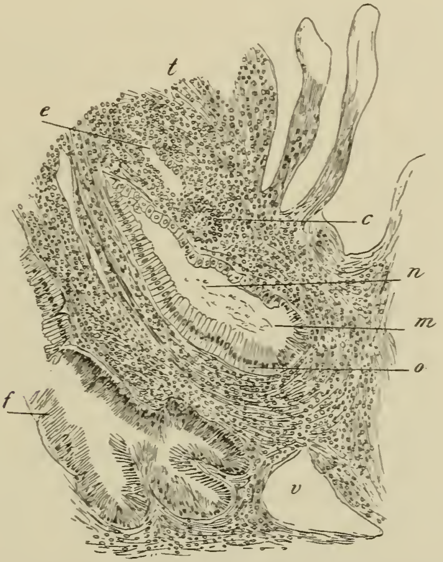


FIG. 248.—TUBERCULOSIS OF THE CERVIX UTERI. 150 diameters. (*Cornil.*)
t. Connective tissue infiltrated with round cells. *e*. Fissures in tuberculous tissue. *c*. Giant-cells. *n*. Epithelial covering of a gland near a tuberculous follicle, showing large epithelial cells. *o*. Epithelial layer formed of elongated cells. *m*. Mucus contained in the gland. *f*. Greatly elongated epithelial cells of a gland. *v*. Vessel.

Tubercles.

Arbor vitæ. Glands.

Round-cell infiltration.

Nodules.

Epithelium.

glands may be fused into a degenerate mass. In the cervical cavity the irritation of the epithelium may cause projections of papillary masses that resemble papillary carcinoma to a greater or less extent. (E. Fränkel.)

Papillary masses.

3. The vaginal portion feels somewhat enlarged and nodular, and usually presents the appearance of a circular, granulating wound. The surface is studded with numerous grayish-white, translucent-looking granules, up to the size of a pinhead, surrounded by vascular spots that bleed readily upon being touched, and are covered by a sticky, yellowish, grumous secretion.

Appearance. Surface. Bleed easily. Secretion.

The surface loses, except in a few places, its normal pavement epithelium. The vascular spots exhibit under the microscope dilated capillaries and bloody extravasations. The granular surface fails to reveal any papillary formation, but the normal tissue is supplanted by areas of small-cell infiltration containing giant-cells. There is more or less caseation superficially, but deeper in the substance of the cervix typical tubercles are found. (R. Emanuel.)

Epithelium. Vascular spots. Granular surface. Caseation. Typical tubercles.

Koch's bacillus can not always be detected.

4. The **symptoms**, except those of cervical endometritis, do not usually attract attention until the disease is well advanced, when local pain, a grumous discharge containing whitish granules, and the development of tuberculosis elsewhere are the chief ones.

Not noticeable. Pain, discharge, etc. Tuberculosis elsewhere.

5. The **diagnosis** is based upon the macroscopical and microscopical appearance described in par. 2, upon the presence of caseous matter (and perhaps giant-cells and tubercle bacilli) in the discharge, the cervical endometritis, and the discovery of evidences of the disease elsewhere in the system. Inoculation of the discharge into the peritoneal cavity of a guinea-pig will usually develop tuberculosis within two weeks.

Reference. Discharge. Cervical endometritis. Disease elsewhere. Inoculation.

6. The **prognosis** is good in cases of primary infection if the disease is recognized before it has spread to other parts.

Good if localized.

When the diagnosis is made the germs have usually obtained a foothold beyond the cervix, or exist elsewhere in the body, and an ultimate devolopment of general tuberculosis may be expected.

General tuberculosis to be feared.

7. **Treatment.** If the tuberculous condition is confined to the cervix, the latter should be amputated well beyond the limits of the disease. If the upper portion of the vagina is likewise affected, that should be removed, and the edges of the resulting wound united by sutures, or cauterized with iodized phenol (three parts carbolic acid and one of crystals of iodin).

Amputation.

Vagina.

CHAPTER III.

TUBERCULOSIS OF THE CORPUS UTERI.

1. Tuberculosis of the body of the uterus commences at or near the fundus, as small miliary tubercles under the epithelium, with inflammation, and sometimes ulceration, over them. In this stage the disease has not been recognized in life nor clinically described. The mucous membrane may present a normal appearance to the unaided eye.

Location.

Inflammation, etc.

Not recognized.

Mucosa.

As the tubercles develop, a few yellowish-white nodules from one to two mm. ($\frac{1}{35}$ to $\frac{1}{70}$ of an inch) in diameter can be seen just below the surface. These gradually increase in size, giving the mucosa a rough and uneven appearance. (T. S. Cullen.) The larger tubercles undergo necrosis and form irregular ulcers covered with caseous matter. The process of caseation and ulceration finally spreads to the entire endometrium, but seldom passes the internal os. It invades the muscularis, causing hypertrophy of the uterine walls, and may finally perforate them. Obstruction of the internal os and pyometra sometimes takes place. This stage is called *diffuse tuberculosis of the uterus*, and is the form usually seen.

Nodules.

Necrosis, etc.

Spread.

Muscularis, etc.

Pyometra.

Usual form.

Histology.

The histology of the tuberculous endometrium is as follows :

Round-cell inflammation. Thickening.

Nodules.

There is a diffuse round-cell inflammation which in some cases causes considerable thickening of the endometrium. Scattered here and there among these round cells are typical tubercular nodules. These consist of giant-cells, epithelioid cells, and small round cells with the reticulum so prominent in tubercular tissue. Exceptionally the epithelium is well developed. Usually it is degenerating or falling away. It may be absent entirely, when there is a surface of granulation tissue.

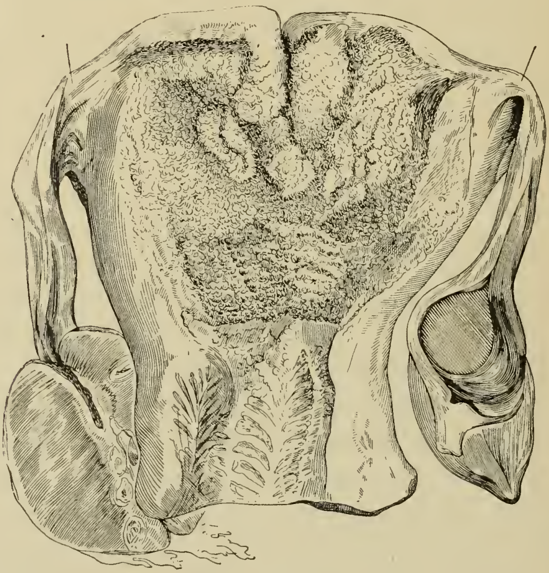


FIG. 249.—DIFFUSE TUBERCULOSIS OF THE UTERUS. (*Barnes.*)

Epithelium.

Absence.

Caseation.

Caseation begins usually in the tubercular nodule. It may spread quite evenly over the whole surface (Evans).

Interstitial form.

An interstitial form of tuberculosis of the uterus has been described that develops slowly, and is only discovered at the autopsy or after rupture of the uterus, or as an obstacle to parturition.

2. The **symptoms** are at first those of endometritis. Later there is a thickening of the uterine walls and a grumous discharge containing cheesy matter. Amenorrhea is a common symptom, and is connected with a state of general debility, and tuberculosis elsewhere. In some cases, however, there is menorrhagia, in others no deviation from the normal. Usually the Fallopian tubes are enlarged and adherent, and may be surrounded by an abundant exudate, extending laterally from the uterus.

Endometritis. Uterine walls. Discharge. Amenorrhea, etc. Menorrhagia. Normal. Tubes. Exudate.

3. The **diagnosis** is based upon the signs and symptoms just mentioned, and upon a microscopic examination of the scrapings.

In malignant disease the hemorrhage, watery discharges, stinking odor, rapid progress, and freedom of the appendages from infiltration serve to differentiate it. In the early stages a microscopic examination of the discharge or of curetted particles may be necessary.

Hemorrhage, discharge, odor, etc. Microscope.

4. The **treatment** should be a total extirpation, preferably per vaginam, and should include a removal of the appendages. If the appendages are extensively affected, an abdominal incision may be necessary. Should there be an extensive development of tuberculosis elsewhere, a curetting and packing of the uterus with iodoform gauze and powder might be done as a palliative measure. In advanced cases of general tuberculosis surgical interference is useless. Antiseptic vaginal douches should be used.

Total extirpation per vaginam. Abdominal. Palliation. Advanced cases. Douches.

CHAPTER IV.

TUBERCULOSIS OF THE FALLOPIAN TUBE AND OVARY.

Frequency. 1. *Tuberculosis of the Fallopian tube* has been found by different observers in from two to eight per cent. of operations for diseased appendages. Primary occurrence. It may occur primarily in the same way as cervical tuberculosis (chap. II, par. 1), the cervix and uterus being at first unaffected, and probably by way of the blood and lymphatics. Blood and lymphatics. Secondary. It is, as a rule, secondary, the infection coming from the peritoneal cavity or through the lymphatics or blood-vessels. In a large majority of cases the tube is the first portion of the genital track affected. First portion affected. It more often begins at or near the fimbriated end, and spreads to the uterus and ovary, Beginning. Bilateral. and is usually bilateral, and is apt to be associated with tubercular peritonitis. Peritonitis. Since the attention of operators has been called to the disease, the frequency with

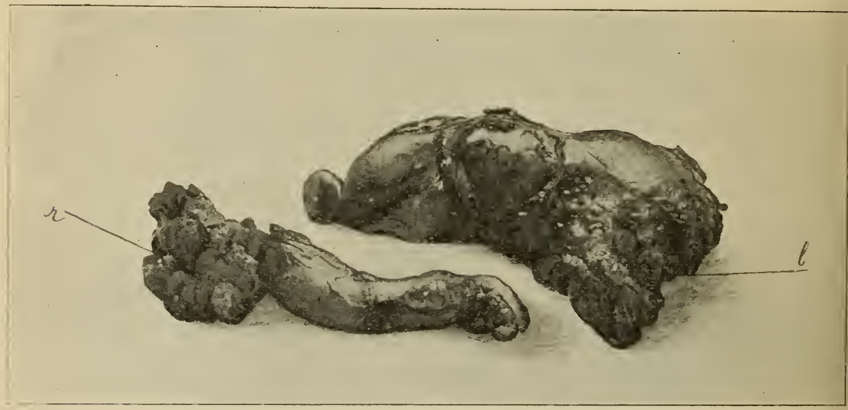


FIG. 250.—TUBERCULOSIS OF THE FALLOPIAN TUBES WHICH WERE FOUND BURIED IN ADHESIONS. (*Author's case*)
l. Ostium abdominale of cystic left tube. *r*. Ostium abdominale of right tube

which it has been found has steadily increased. It occurs by preference in young women, although childhood and old age are not exempt. Increase. Young women, etc

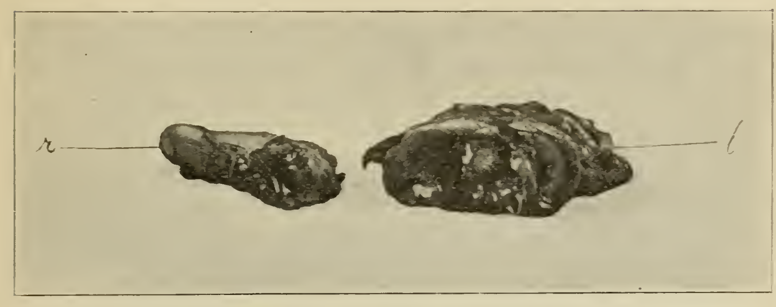


FIG. 251.—Same as FIG. 250. TUBES CUT TRANSVERSELY IN TWO, SHOWING LUMEN. *l.* Left tube. *r.* Right tube.

2. **Pathological Anatomy.** Tuberculosis of the tubes generally commences in the *miliary form* as a deposit of tubercles in places underneath the inflamed epithelium, and presents the appearance of catarrhal salpingitis. This stage is of no clinical importance, since its character can not be recognized Beginning. Miliary form. Like catarrhal salpingitis. Not recognizable.

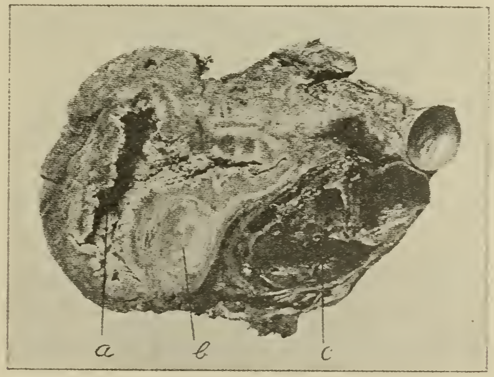


FIG. 252.—TUBERCULAR PYOSALPINX. (*Freeborn.*)
a. Lumen of the tube *b.* Tubercular mass in the mesosalpinx. *c.* Cystic ovary.

except by a microscopic examination of the removed parts (the "unsuspected genital tuberculosis of Williams").

Chronic diffuse variety. Mucous membrane. Walls. Nodular thickening. Peritoneum. Exudate. Peritonitis.

3. As in the uterus, the *chronic diffuse tuberculosis* is the variety ordinarily met with in the tube. It affects, as a rule, a large portion or all of the mucous membrane, but does not invade the muscular wall until late, when there is hypertrophy of the muscular connective-tissue fibers, and sometimes nodular thickening of the isthmus. The peritoneal surface becomes infiltrated and thickened, and the enlarged distorted tubes are buried in exudate which covers also the uterus and bladder. Tubercles and exudate are found on the visceral and parietal peritoneal surfaces, constituting tubercular peritonitis.

Agglutination, etc. Caseation and ulceration. Muscular tissue. Cells below surface.

There is agglutination of the mucous folds, and destruction of the epithelium, and some of the muscular tissue. The tubercles undergo caseation, producing ragged ulcers, and sometimes an almost complete denudation of the muscular tissue, which is exposed when the caseous material is removed, and which itself is finally affected. As the epithelium is destroyed, some cells remain isolated below the surface and line the closed spaces produced by the agglutination of the folds, or they extend like glandular tubes between the tubercular masses, or they may become converted into giant-cells (A. Martin).

Discharge of contents. Accumulation. Density. Amount. Tubo-ovarian cysts. Nature of fluid.

The material contained in the tube may exude from the fimbriated end, or, if the tube is closed, may accumulate, with mucus, granular débris, and sometimes pus, forming a cystic salpingitis. It may be quite thin, or thick and cheesy, or hard and dry, or even calcified. Ordinarily the accumulation is small in amount, but it may attain large proportions. Tubercular tubo-ovarian cysts have been observed. The fluid consists mainly of fatty, degenerated leukocytes, balls of fat nuclei, free nuclei, and fat globules. Epithelial cells are seldom present (A. Martin).

Bacillus.

Koch's bacillus is sometimes found in the giant-cells, sel-

Pus and germs.

dom elsewhere. Pus germs may never be present, or only for a time, and both the germs and pus afterward disappear.

Fibrous tissue. Lumen. Inflammation. Chronicity.

4. *Chronic fibroid tuberculosis* of the tubes (Williams) differs from the above in that there is a large amount of fibrous tissue and a small number of tubercles. The lumen is greatly distorted. Inflammatory changes may or may not be present. The marked feature appears to be its chronicity.

Association.

5. The *ovary* may be affected in connection with tuberculosis, either of the tube or of the peritoneum, or of both. In rare instances it is the seat of primary isolated tuberculosis.

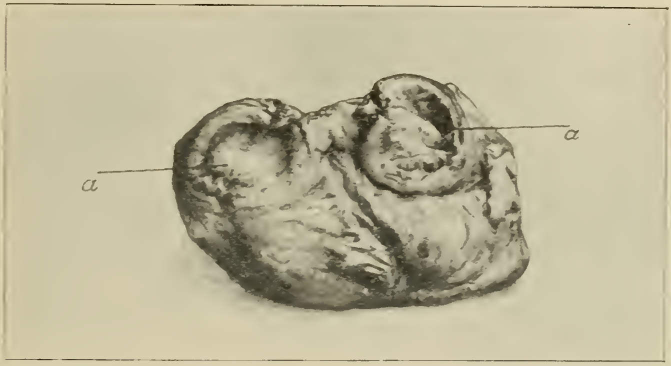


Fig. 253.—Thick walled Abscess of Ovary, found in connection with Tubercular Salpingitis, and Containing a Thin Grayish Fluid. (*Author's case.*)
a, a. Abscess cavity laid open.

Varieties.

The bacilli reach the ovary by way of the blood, and may affect both sides. Miliary tubercles, caseous masses, and tuberculous abscesses are the varieties of the disease found.

Miliary stage. Adhesions.

In the miliary stage, and in the beginning of cheesy degeneration, the changes, although situated near the periphery of the organ, may not be recognizable without the aid of the microscope. Adhesions are not usually found until the disease is well advanced, unless it results from coincident tubal tuberculosis.

Overlooked.
Similarity.
Menstruation.

6. **Symptoms and Diagnosis.** In many cases the symptoms are overlooked because they are mild or have been overshadowed by those of other disease, particularly of tuberculosis, elsewhere. In other cases they do not differ from the symptoms of other forms of tubal inflammation. Menstruation is usually abundant, prolonged, and painful in severe cases.

Salpingitis.
After labor or marriage.
Virgins.
Enlarged, knotty.
History, etc.
Adhesions, etc.
Temperature.
Remissions, etc.
Steady progress.
Glands.

Salpingitis occurring in healthy women soon after marriage, or after labor, abortion, or a known attack of gonorrhea, is seldom tuberculous in character, although tuberculosis of the tube is occasionally developed after labor (Hünermann) or soon after marriage. When it occurs in delicate virgins, with considerable enlargement and a knotty induration of the appendages, particularly if there is a tuberculous family history, or in women affected with the disease elsewhere, or married to an infected husband, we suspect it to be of tuberculous nature. Extensive adhesions and encysted peritonitis in the lower abdomen adds greatly to the probability. A low morning temperature, with slight afternoon rise, extending over a long period of time, is characteristic in many cases. Ordinary salpingitis is subject to remissions and exacerbations of symptoms dependent largely upon traumatic influences, while the tubercular variety shows less-pronounced remissions, is more steady in its progress, and remains about the same, or gets worse in spite of all precautions. In advanced cases the contiguous lymphatic glands in the pelvis may be felt to be enlarged.

Unfavorable.
Early operation.
Primary infection, etc.

7. The **prognosis** is, as a rule, unfavorable. However, an early operation will cure many cases in which there is but little infection elsewere in the system. A primary infection may cause a mild catarrhal inflammation that ends in recovery from the disease (Schuchardt); or in fibroid tuberculosis, which will also be considered a favorable termination.

Removal.
Contraindications.

8. **Treatment.** The only curative treatment is removal of the appendages. The contraindications are general infection and a spread of the disease to the extent of making the

Uterus. Peritonitis. Abdominal section.

complete removal of the disease impracticable. The uterus, if possible, should be removed also. Tubercular peritonitis is not a contraindication, since it is apt to be benefited by the operation. The abdominal section should be preferred, since a more complete removal of diseased tissue can be effected; but vaginal hysterectomy may be indicated if the uterus is affected and the tubes not surrounded by much exudate. (Part VII, chap. XI, par. 14.)

CHAPTER V.

TUBERCULOSIS OF THE PERITONEUM.

Secondary. Tubes. Source.

1. Tuberculosis of the peritoneum in women is ordinarily a secondary infection, and is associated with tuberculosis of the Fallopian tube in more than one-third of the cases, and may precede, follow or arise coincidently with it. The infection comes by way of the lymphatics from the abdominal viscera, from the general circulation, or by inoculation from the ostium abdominale tubæ.

Varieties.

The three varieties, miliary, fibroid, and caseous, have been observed.

Forms.

2. **Miliary Tuberculosis.** Miliary tuberculosis may exist in a latent and an acute form.

Without symptoms. Cure, etc. Discovery.

In the *latent* form scattered tubercles develop under the endothelial surface without noticeable symptoms, and may go on to the fibroid condition and a practical cure without having been detected. Of this nature are the cases that are discovered by accident at peritoneal sections, and also those which subsequently get well.

Surface.

In the *acute* form the peritoneal surface over the tubercles may be slightly hyperemic, or it may be in a state of active inflammation and desquamation, with intense redness, loss of Serum. luster, and a fibrinous exudate. A yellowish or bloody serum Encysted. may be free in the abdominal cavity, particularly when the disease is complicated by tuberculosis of the liver. Or the ascites may be encapsulated by visceral, parietal, and omental Adhesions. Situation. adhesions. The tubercles are situated between the layers of

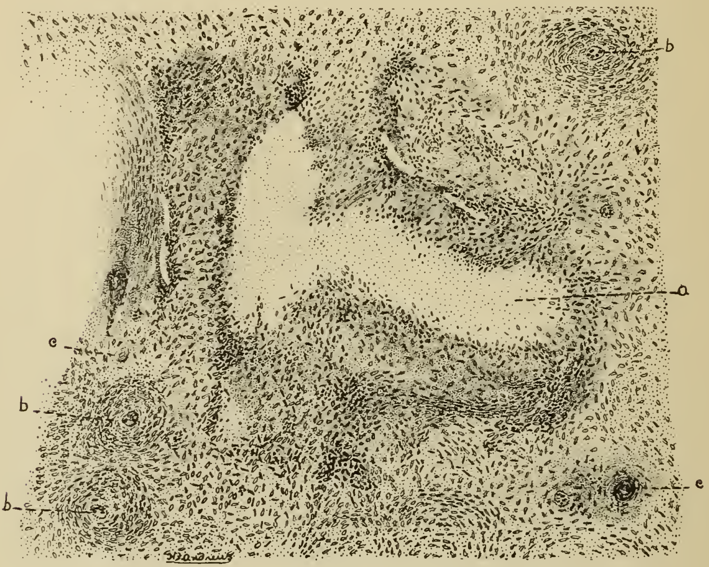


Fig. 254.—Tuberculosis of the Peritoneum. (*Prepared by Evans from author's case.*) × 80.
a Caseous area; *b*, *b*, *b*. Small tubercles with giant-cells. *c*, *c*. Arteries with thickened walls.

peritoneum over some of the viscera, or are scattered over the visceral and parietal surfaces.

Development. 3. The *symptoms* may either develop suddenly or gradually. Prodromata. In all cases some prodromata are present, such as occasional slight abdominal pains, a tendency to tympanites, imperfect digestion, loss of flesh, and subnormal morning, and slightly elevated afternoon, temperature.

Progress. These prodromata may gradually become more pronounced with the supervention of severe pains, tenderness, marked tympanites, ascites, loss of appetite, emaciation, and sometimes diarrhea and exhaustion, or they may develop into those of the caseous variety. Caseous variety. Pigmentation of the skin is occasionally observed. Pigmentation.

In some cases these symptoms exist for a time and grow worse suddenly ; Sudden development. in others the prodromata are mild and overlooked, and acute peritonitis is rapidly developed from a state of apparent health. Peritonitis. The temperature goes up rapidly to 102° or 103° F., with general tympanites, shallow respiration, lancinating pains in the abdomen, great tenderness, nausea, and sometimes diarrhea. After a few days these symptoms partially subside, and improvement, or apparent recovery, takes place. Subsidence. Sooner or later, however, other attacks follow, and caseous peritonitis or general tuberculosis supervenes. Recurrent attacks.

Pleuritic pains with accelerated respiration, hepatic pains with severe gastric disturbance, or iliac and lumbar pains with preponderance of pelvic disorder, are present in many cases, and indicate the area of localization. Areas of localization.

4. *Diagnosis.* The prodromata, the gradual onset, and the progressive development, suggest the tuberculous nature of the inflammation. Prodromata, onset, development. The presence of extensive induration about the Fallopian tubes not traceable to labor, abortion or gonorrhea, Induration. nor to the presence of encysted ascites, and of tuberculous disease elsewhere in the system, Ascites. Tuberculosis elsewhere. also aid us materially in differentiating it from peritonitis due to ordinary salpingitis, appendicitis, and disease of the gall-bladder. Malignant peritonitis is seldom encysted, is more often connected with a tumor or characteristic enlargement of an organ, Malignancy. Tumor, etc. has less extensive acute attacks, and a more rapid progress. Tuberculous peritonitis sometimes progresses rapidly, but is then not liable to be confounded with malignant diseases. Seldom confounded. (See par. 14.)

In making an exploratory incision the presence of some ascitic fluid first attracts the attention. The peritoneum feels roughened by the tubercles, which are grayish in appearance and surrounded by reddened lusterless peritoneum. The uterine adnexa of the affected side are thickened and adherent, and often covered up with an exudate which is spread over the entire pelvis.

Recovery.

5. The *prognosis* in the slow form is not necessarily unfavorable, many cases passing into the fibroid stage and ultimately recovering. That of the rapidly developing form is usually, although not invariably, unfavorable.

Unfavorable variety.

General.

6. *Treatment.* Tonics, hygienic regulations, a concentrated, easily digested diet, such as milk, eggs, the peptonoids, lean meat, rice, and cod-liver oil, are indicated in a general way. Peritonitis should be treated by rest in bed, hot fomentations, saline laxatives, and later by counterirritation over the abdomen with tincture of iodin.

Peritonitis.

Abdominal incision.

Evacuation of the ascitic fluid by a short abdominal incision (part I, chap. IV, par. 7), and the insufflation of a small quantity of air and iodoform, has a better effect, and is safer, than tapping. R. T. Morris, following Cantani's suggestion, claims that the bacteria of putrefaction that enter with the air assist in destroying the tubercle bacilli. Drainage is seldom necessary unless adhesions have been separated that leave oozing surfaces, and then should be accomplished by a glass tube of small caliber used only until the bloody oozing ceases.

Bacteria of putrefaction.

Drainage.

Last stage.

7. **Fibrous Tuberculosis.** Fibrous tuberculosis represents the last stage of the disease in cases that do not result in caseation. The ascitic fluid has disappeared, the adhesions have become dense and fibrinous, and the tubercles and peritubular cells have undergone degeneration. A proportionately small amount of tubercular cellular tissue and a large amount of fibrous tissue is found. They are from one to three mm. in diameter, hard, and usually pigmented. The

Ascites. Adhesions.

Tubercular tissue. Fibrous. Tubercles.

omentum is apt to be thickened and retracted, forming an apron or ridge extending across the upper abdomen.

Omentum.

8. *Symptoms.* The symptoms are usually mild, and consist of the prodromata described in paragraph 3, and often a marked tendency to constipation. Unless the condition is complicated with some other form of the disease, or aggravated by unfavorable influences, the signs and symptoms slowly diminish in severity, and may in time disappear.

Mild.
Prodromata.
Constipation.
Improvement.

9. The *diagnosis* is based upon the mild character of the symptoms, their persistence without becoming worse, and the discovery of tuberculosis elsewhere. There may be slight localized areas of tumefaction, or of distended intestinal coils surrounded by indurated lines, in the abdomen. These are resonant, unaccompanied by ascites, and have not the history of the characteristic acute attacks that precede septic salpingitis, appendicitis, or suppuration of the gall-bladder, with which they might be confounded.

Persistent mildness.
Disease elsewhere.
Resent tumefaction.
No ascites.
History.

10. The *prognosis* is favorable with regard to the local condition, but is apt to be unfavorable by reason of the development of tuberculosis in other organs.

Locally favorable.
Development elsewhere.

11. The *treatment* consists in the ordinary treatment for the tuberculous conditions, and in special treatment of the local symptoms. Bismuth and salol or naphthol, the digestive ferments, and a carefully regulated diet, may be required for gastro-intestinal irritability and impaired digestion. Constipation should be combated with mineral waters or other laxatives. Counterirritation over the abdomen by the tincture of iodin, and, later, gentle abdominal massage and mild faradism may be used. As much outdoor exercise should be taken as possible without increasing the local tenderness.

Tuberculous condition.
Local.
Alimentary canal.
Constipation.
Counterirritation.
Massage.
Faradism.
Out-door exercise.

12. **Caseous Tuberculosis.** In caseous tuberculosis the tubercles occur in the same tissues as the miliary form, but caseation, ulceration, agglutination of the peritoneal surfaces, ascites, fibrinous exudation, and suppuration take place. The

Same tissue.
Changes.
Ulceration, etc.

Fistulæ.

ulceration may give rise to fistulæ between the intestinal coils; or fistulæ may lead from tubercular deposits into the intestines or bladder, or outward through the skin, leaving tracks of variable length which show but little tendency to heal.

Ascitic fluid.

The ascitic fluid may be thin or thick, light- or dark-colored. It may be general or sacculated. As the result of degenerative changes in the fibrinous, epithelial, and bloody constituents, it may contain granular and fatty matter (ascites adiposus), the latter from a trace up to 6.4 per cent. It may be mixed with pus, or be entirely converted into pus; or serum may be found in one place and pus in another.

Local accumulations, etc.

Local accumulations of fluid, and masses of matted viscera and tuberculous tissue, with a fibrinous exudate on the contiguous peritoneal surfaces, are found in most cases. Among the favorite places for such localization are the regions about the uterine appendages, the cecum, the omentum, and the liver.

Regions.

Past history.

13. *Symptoms.* There is usually a past history of attacks of acute miliary tuberculosis of the peritoneum, although they may not have been diagnosed at the time of their occurrence.

Like those of miliary.

The symptoms are those of the acute miliary form, but are less active in character and more persistent. There is a moderate daily afternoon elevation of temperature, and sometimes a slight morning fall, continuing for many weeks, with tympanites, abdominal or pelvic pain, occasional or frequent attacks of diarrhea, vomiting, scantiness of urine, loss of appetite, emaciation, night sweats, and of localized tumefaction or encysted fluid. In old cases acute attacks of peritonitis and the evidences of fistula, or even of intestinal obstruction, may appear.

Temperature, tympanites, pain, diarrhea, etc.

Old cases.

Localized.

If the pathological changes are confined to a small area, the symptoms assume the form of a localized inflammation, and the general symptoms and impairment in health may be slow in making their appearance.

General symptoms, etc., late.

14. *Diagnosis.* When the disease occurs in combination with tubercular salpingitis, the peritonitis is apt to be connected with ascites, and is more extensive than chronic peritonitis due to septic disease of the appendages. The salpingitis also presents differences (chap. IV, par. 6).

With salpingitis. Ascites. More extensive.

Encysted tubercular peritonitis of pelvic origin may be mistaken for *ovarian tumor.* In addition to the local signs mentioned in part XII, chap. II, par. 13, the presence of salpingitis, the induration of the sacro-uterine folds as felt by the finger introduced into the rectum, the slow development, and other signs and symptoms of tuberculosis, serve to distinguish it. An ovarian tumor with pelvic adhesions presents severe increasing pelvic symptoms with proportionately less general depression than tuberculosis.

Local signs. Salpingitis. Sacro-uterine ligaments. Slow development. With adhesions.

Chronic appendicitis has a history of acute attacks of local inflammation, with complete or almost complete restoration of health and subsidence of the swelling between attacks, and without the progressive signs and symptoms of either local or general tuberculosis. Abscess about the appendix vermiformis, with intestinal fistula, is known by the history of attacks of pain and fever about the cecum, followed by diarrhea, with pus in the stools, and the general symptoms of septic infection, and without the evidences of tuberculosis in other parts. (See par. 4.)

Acute attacks. Complete intermissions. Without progressive signs. Abscess. History. Symptoms. Tuberculosis elsewhere.

When the peritoneal cavity is opened in encysted peritonitis with tuberculosis of the adnexa, one is apt to cut directly into an accumulation of fluid somewhat thicker and deeper in color than ordinary ascites, and containing fibrinous shreds and flakes in its lower portion. The fluid is partly surrounded by a thick, rough, but soft capsule of fibrinous tissue that becomes quite thin above where the lightly agglutinated intestines shut it off from the remaining peritoneal cavity above. Distinct tubercles are not always visible.

Cavity opened. Character of fluid. Capsule. Agglutinated intestines. Tubercles.

15. The *Prognosis* is unfavorable, as but few cases are

Unfavorable.

Localized.

permanently relieved. However, when the disease is localized, it is occasionally cured by surgical interference.

Evacuation. Removal. Adhesions. Danger of separating them.

16. *Treatment.* The only hope for a cure is by evacuation of the fluid and removal by abdominal section of the affected tissues, or of such of them as show the disease in an advanced stage. Separation of extensive, firm, intestinal adhesions, except such as may be necessary to evacuate encysted fluid or relieve pain or intestinal obstruction, is not advisable on account of the danger of producing an intestinal fistula.

Appendages. Drainage. Duration. Uterus.

When the appendages are diseased they should be removed, together with as much of the fibrinous exudate or accompanying sac as possible. Drainage will usually be necessary, but should only be continued until the fluid withdrawn becomes trifling in amount and clear—usually from thirty-six to forty-eight hours. The uterus, if affected, should also be removed.

Condition of patient. Evacuation. Cyst wall.

In some cases the condition of the patient neither permits of grave operative procedures nor presents sufficient hope of a cure of the tuberculous condition to justify assuming much risk, and we must content ourselves with evacuating the fluid. If it is encysted, such portions of the cyst wall as are not firmly adherent, and all loose fibrinous tissue, should be removed.

Removal impossible. Pockets opened. Iodoform powder. Tampon. Management.

In case much of the tuberculous tissue can not be removed, the pockets of fluid should be freely opened up and strewn with five or six gm. of iodoform powder, and the culdesac of Douglas and contiguous diseased areas loosely tamponed with iodoform gauze. About a quarter of this should be removed each day until it is all out, and then a small quantity be introduced and changed every six or eight hours for two or three days longer.

CHAPTER VI.

TUBERCULOSIS OF THE FEMALE BLADDER.

1. Vesical tuberculosis affects women much less frequently than men. It may develop at any age, but occurs most frequently between puberty and the menopause. Although it may exist as a primary affection, it is nearly always secondary to tuberculosis in the gential organs, kidneys, or other parts of the system.

Sex. **Age.** **Secondary.**

2. **Pathological Anatomy.** The local affection begins as a circumscribed or scattered growth of miliary tubercles under the epithelium, either at the base of the bladder or at the mouths of the ureters, according to the direction from which the infection has come. The mucous membrane becomes reddened about the tubercles, and passes into a state of active inflammation, with round-cell infiltration and thickening of the walls. Hyperplasia advancing to sclerosis of the organ is characteristic of the later stages. As the tubercles undergo caseation, a number of small ulcers, or one large one, appear, which have the ordinary excavated necrotic surface of tubercular ulceration. Large cheesy masses are seldom observed. Perforation is rare on account of the thickening of the tissues that precedes the ulcerative process. When it occurs it is usually through the vesicovaginal septum or into the surrounding connective tissue, and may lead to a fistula opening into the vagina, perineum, rectum or hypogastrium.

Deposit. **Location.** **Mucous membrane.** **Inflammation.** **Hyperplasia, etc.** **Ulceration.** **Cheesy masses.** **Perforation.** **Fistula.**

The disease in rare instances extends to the urethra.

Urethra.

3. **Signs and Symptoms.** The first symptom usually complained of is getting up at night to pass urine, and, later, frequent micturition also in the daytime. Although painless at first, the passage of urine gradually becomes painful, but may continue a long time without serious consequences. In severe advanced cases the urine is voided at

Frequent micturition. **Dysuria.** **Severe cases.**

frequent intervals both by day and night, and is accompanied by excruciating pain that commences before the evacuation and persists after it is over, and causes rapid deterioration in the health of the patient. Urethral tenesmus may complicate the advanced stages, and cause temporary painful retention.

Effect on health. Urethral tenesmus.

Hematuria. Beginning. Appearance.

Hematuria is one of the early symptoms. It commences in a gradual manner before pain, and sometimes before the nocturnal frequency of micturition, and gives the urine a pinkish or reddish tint that may not at first be noticed by the patient. A little blood may follow the last of the urine. The signs of blood are not constantly present, and may disappear as the disease advances, to reappear in greater abundance in the ulcerative stage. Clots sometimes interfere with the evacuation of the bladder. The urine is abundant but of normal appearance, when not tinged with blood, until ulceration takes place, when it becomes somewhat turbid at times, and contains mucus and pus. Bacilli are passed in the urine, but after the suppuration is abundant they can not always be discovered.

Not constant. Clots. Urine. Bacilli.

Redness. Later appearances. Base of bladder.

A *cystoscopic examination* reveals in the beginning a moderate redness over the tubercles. Later the mucous membrane presents a reddened, velvety, more or less corrugated appearance, which is ordinarily more pronounced at the base of the bladder.

Ulcer.

The ulcerated surface is smooth, and covered with pale, grayish-red, glistening granulations. The edges are slightly raised and somewhat paler than the surrounding mucous membrane.

History. Tuberculosis elsewhere.

4. **Diagnosis.** The family and personal history of the patient, as well as the search for the tuberculosis in other parts of the system, are of value as indicating the nature of the symptoms, and should be considered in cases of hematuria or cystitis of unknown origin and of insidious development.

Renal colic.

Stone in the bladder is apt to be preceded by renal colic, and causes pain upon motion, which subsides when the patient lies down, and gives less trouble at night than tuberculosis. The tenesmus is greater, and is greatest immediately after the urine is voided, instead of being on the wane. The hemorrhage is brought on by active exertions, and follows the passage of urine. Intermittent stoppage of the flow occurs, and tubercle bacilli are absent.

Pain on motion. Nights. Hemorrhage. Stoppage. Bacilli.

In *tuberculous pyelonephritis* there is more pus and débris in the urine, more decided general septic symptoms, a more rapid progress of the disease, and the physical signs of pyelonephritis.

Urine. Sepsis. Progress, etc.

The presence of the bacillus tuberculosis in the urine, and the local signs as discovered by a cystoscopic examination, usually confirm the diagnosis.

Bacillus. Local signs.

5. **Prognosis.** The ultimate prognosis is unfavorable. Occasionally recovery takes place, but as a rule the disease progresses, gradually wearing out the patient, and causing pyelonephritis, abscesses in the neighboring connective tissue, fistulæ, etc. The patient may be carried off by a development of the disease in some other part of the body.

Unfavorable. Progresses, etc. Development elsewhere.

6. **Treatment.** The internal remedies for ordinary cystitis (part VII, chap. V, par. 9 and 10), and the avoidance of ingesta that render the urine irritating, are indicated, together with a tonic and hygienic treatment and a residence in a warm and equable climate. Opium must at times be administered freely to relieve the pain and give the patient rest at night.

Internal remedies, etc. Climate. Opium.

A vesical douche once or twice daily of a saturated solution of boracic acid, one per cent. of lead acetate or sodium salicylate, have a beneficial action on the mucous membrane. Distress should not follow its use. Some surgeons prefer the injection of one or two gm. (15 to 30 drops) of a 1 : 1000 to 1 : 5000 solution of corrosive mercuric chlorid (Guyon). The injection into the bladder of one or two gm. (15 to 30 minims) of a 20 per cent. solution of guaiacol carbonate con-

Douche. Distress. Small injections.

taining one per cent. of iodoform is said to ameliorate the symptoms (Colin).

Local applications.

The local applications of strong carbolic acid, or of five to ten per cent. solutions of nitrate of silver or zinc chlorid, once or twice a week, according to tolerance, may be made through the cystoscope.

Drainage. Dilation. Fistula. Urethra.

When all means fail to relieve the pain and tenesmus, drainage of the bladder by dilation of the urethra or the formation of a vesicovaginal fistula affords relief. The fistula may be kept open for several weeks or even months.

PART NINE.

CARCINOMA.

CHAPTER I.

CARCINOMA OF THE VULVA.

1. Carcinoma of the vulva usually begins as a small, round prominence, covered by thickened layers of squamous epithelial cells, more often on the inner side of one of the labiæ. Its surface is usually roughened by tiny red elevations. As the months pass by the nodule slowly increases in size, the margins assume a livid color, and the skin breaks down, leaving an ulcerated surface from which a thin, puriform fluid of disagreeable odor exudes. The base and copper-colored margins of the ulcer are indurated, while granular or papillary excrescences may appear over its surface. Beginning. Development. Indurated and papillary nature

The disease extends over the vulva and surrounding skin, but not into the vagina. The inguinal glands become affected late in its course. It is met with more often in women between the ages of forty and sixty years. Extension. Age.

2. **Symptoms and Diagnosis.** Some itching is usually felt, but the nodule often remains unnoticed for a long time, and may be discovered accidentally. Later necrosis of tissue, fetid discharge, local irritation, shooting pains, and hemorrhage are noticed. Anemia, septicemia, and extreme debility gradually supervene, as in all cases of cancer. Local. General.

The disease runs its fatal course in about two years. Duration.

Microscope. The diagnosis is made by microscopical examination of the tissue.

Extirpation. 3. The **treatment** in early cases should consist in extirpation of the diseased tissues and suture of the raw surfaces. When the wound can not thus be satisfactorily closed, it may be cauterized with the thermocautery. Glands. Enlarged inguinal glands should at the same time be extirpated.

Palliative curetting and cautery. If the diseased tissue can not be entirely removed, the ulcerated surfaces may be scraped, and touched with strong carbolic acid, and afterward washed with a two per cent. solution of carbolic acid or creolin two or three times daily, and the surfaces dressed with iodoform gauze cut into narrow strips, or with salicylated absorbent cotton. External application. Oxid of zinc ointment mixed with five per cent. of carbolic acid may be applied to the surrounding skin to protect it from the discharges and relieve the irritation.

Alcohol injections. Numerous injections (10 or 12) of a few drops of pure alcohol throughout the infiltrated area have been found to retard the development of the disease. The injections are used every day or two, according to the toleration of the patient (Schultze, Vulliet).

Nodules. 4. *Fibrous carcinoma* appears as one or more nodules in the connective tissue of the labiæ or about the mouth of the urethra, which lead to general infiltration, ulceration, necrosis of tissue, and sometimes to the establishment of small cavities or fistulous tracks. General infiltration, etc. Lymphatics. The deeper lymphatics are affected sooner, and pain appears earlier, than in cases of epithelioma. Later symptoms. The later symptoms correspond to the later symptoms of epithelioma, and the treatment is the same. Rare. This form of the disease is exceedingly rare.

CHAPTER II.

CARCINOMA OF THE VAGINA.

Two forms.

1. Carcinoma of the vagina is usually secondary to carcinoma of one of the surrounding organs. As a primary affection it occurs in the form of a superficial squamous-cell growth and a submucous diffuse infiltration.

Age. Superficial variety. Appearance. Extension.

Carcinoma of the vagina has been found in children, although one-third of all cases appear after the fortieth year. It usually begins as a circumscribed, projecting, papillary nodule on the posterior vaginal wall, which soon breaks down on the surface and assumes the form of a raised, ulcerating, cauliflower-like mass with everted edges, but later is converted by necrosis of tissue into an excavate ulcer. Sometimes it assumes the form of a sessile growth of friable tissue. It spreads into the connective tissue as well as along the surface, and the necrosis that results may give rise to deep excavations or to a rectovaginal fistula.

Submucous. Infiltration. Spreads around vagina. Ulceration.

The *submucous* or *diffuse variety* appears first as one or more small nodules, and produces a flat area of infiltration under the normal vaginal membrane, which spreads along and around the vagina until the latter feels like a narrow opening through a mass of hard, unyielding tissues. Ulceration and excavation sooner or later take place, with a corresponding softening of the parts. The surrounding tissues are early infected. If the disease commences near the urethra, it may spread in the same manner around the urethra.

Discharge. Pain.

2. The **symptoms** are at first confined to a thin, irritating discharge, with more or less itching of the vulva. Before long the discharge becomes offensive, bloody at times, and contains some tissue débris. Pain radiating from the vagina is soon experienced, and sometimes backache and bearing-down sen-

General symptoms.

sations. Later the pains connected with infection of the neighboring organs, and symptoms of anemia, septicemia, and extreme debility, make their appearance. Uremia, from pressure upon the ureters, is occasionally observed.

Benign papilloma.

3. The **diagnosis** of the papillary form from *benign papilloma* is made by the firmness at the base of the ulcer, the friability of the tissue, and the odor and character of the discharge. The discharge from benign papilloma is mucoid or serous, sometimes red or brown from admixture with blood, and may have a faintly disagreeable odor. Tuberculous ulcers are not so vascular nor offensive, are not so prone to bleed, and develop more slowly. A microscopic examination of the tissues is often necessary to exclude sarcoma.

Tuberculous ulcers.

Circumvaginal hardness. Sloughing.

Submucous carcinoma is easily recognized by the board-like hardness or the extensive sloughing character of the circumvaginal infiltration, and by the usual symptoms of cancer.

Extirpation and cautery.

4. **Treatment.** If possible, the diseased tissue should be completely extirpated, together with as much of the underlying connective tissue as possible, and a strip of healthy vaginal wall all around, at least a centimeter (⅓ of an inch) wide. The wound should be cauterized with the thermocautery, or with the solution of the acid nitrate of mercury. In some cases it becomes necessary to split the perineum and posterior vaginal wall up to the growth in order to render it accessible.

Splitting of perineum.

Curetting and cautery.

When it is no longer possible to remove all of the tissue, the surface may be curetted, and the solution of ferric chlorid be applied once a week, if it is tolerated that often. Astringent and antiseptic douches, such as a two per cent. solution of alum, or lead acetate, or 1 : 2000 solution of potassium permanganate, help to diminish hemorrhage, destroy the odor, and prevent septic absorption. Alcohol injections (see treatment of epithelioma of vulva, chap. I, par. 3) may be tried.

Astringents and antiseptics.

Alcohol.

CHAPTER III.

CARCINOMA OF THE CERVIX UTERI.

(*High Amputation of the Cervix. Vaginal Hysterectomy.*)

Age.

One-third in multiparæ.

1. Carcinoma of the cervix has been observed from the seventeenth year to extreme old age, more often between thirty and fifty. One-third of all cases of cancer in women occur in the cervices of multiparæ. This is explained by the facts that the cervix is so often rendered susceptible to infection by laceration and erosion, and is readily reached by the carriers of germs.

Reason.

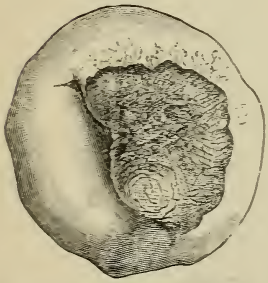


FIG. 255.—COMMENCING SQUAMOUS-CELL CARCINOMA OF THE VAGINAL PORTION. (*Schroeder and Hofmeier.*)

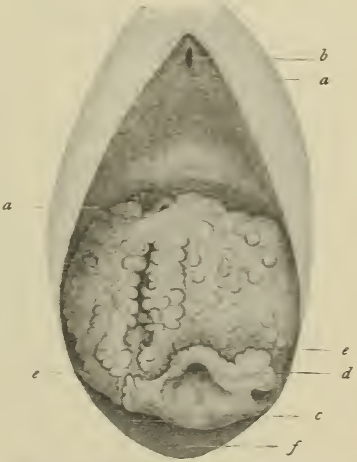


FIG. 256.—ADVANCED SQUAMOUS-CELL CARCINOMA OF VAGINAL PORTION DRAWN DOWN TO THE VULVA. (*J. Williams.*)

a, a. Anterior vaginal wall. *b*. Orifice of urethra. *c*. Posterior lip of cervix. *d*. Os externum. *e, e*. Carcinoma on anterior lip. *f*. Posterior wall of vagina.

Two varieties.

2. **Pathological Anatomy.** Both the squamous- or pavement-cell and the cylindrical- or columnar-cell varieties of

Where found.

carcinoma are found in the cervix. The first variety originates upon the vaginal portion of the cervix (Figs. 256 to 260), the latter within the cervical cavity (Figs. 262 to 266) or upon the cylindrical epithelium of the everted or eroded mucous membrane (Fig. 260).

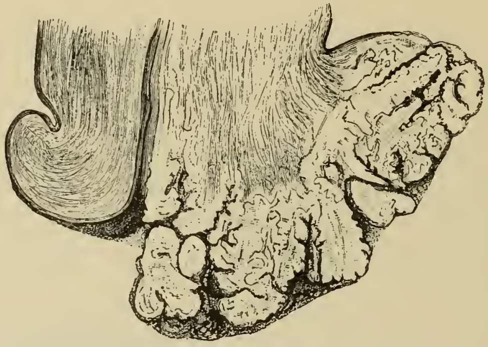


FIG. 257.—SAGITTAL SECTION OF CERVIX IN ADVANCED SQUAMOUS-CELL CARCINOMA OF THE VAGINAL PORTION. (*Winter-Riegel.*)

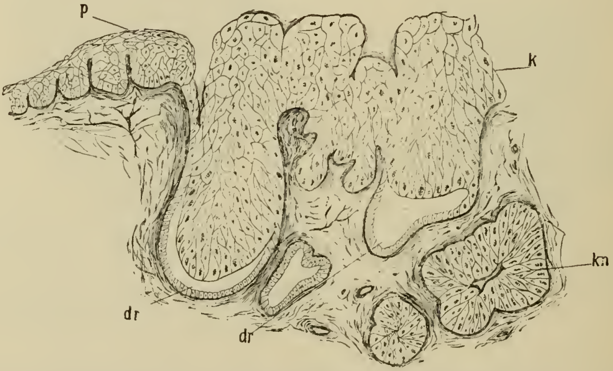


FIG. 258.—MICROSCOPIC SECTION OF SQUAMOUS-CELL CARCINOMA OF CERVIX. (*Ruge and Veit*)

p. Epithelium of vaginal portion. *k*. Proliferation of epithelial cells extending into glands, *dr*, *dr*. *kn*. Nest of epithelial cells.

Papillary growth.

3. Squamous-cell carcinoma is met with in the form of a papillary growth (cauliflower excrescence, mushroom cancer,

papillary cancer, cancroid), and is the most common form of carcinoma of the female genitals. It starts on the vaginal portion as a raised hard mass of enlarged papillæ, covered by

Common.

Starting place.

Minute anatomy

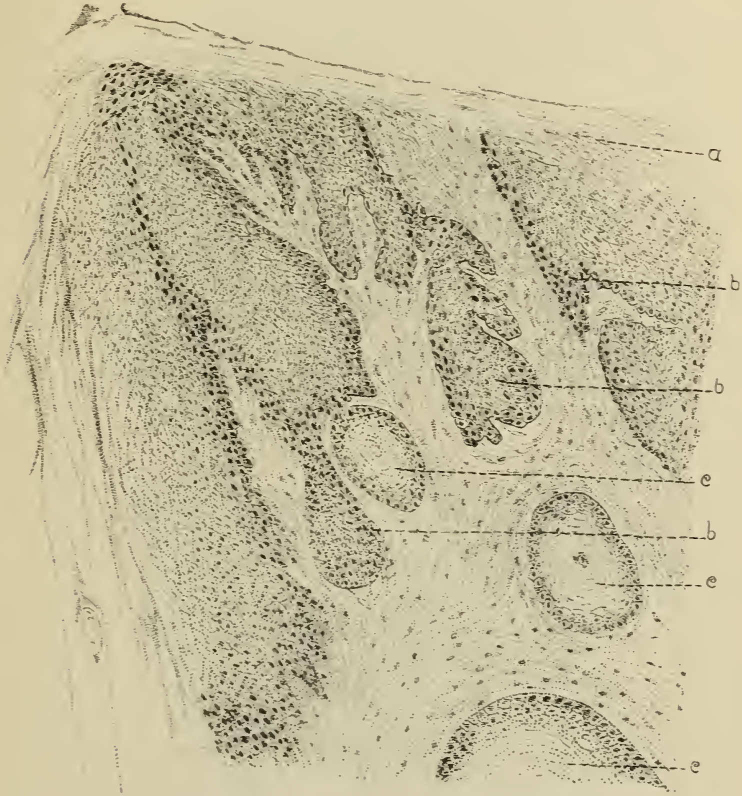


Fig. 259.—Microscopic Section of Squamous-cell Carcinoma of the Cervix. (*Prepared by Evans from Author's Case.*)

a. Epithelial covering. The outer layers have undergone considerable keratin transformation. *b, b, b.* Epithelial bands extending into the underlying structures *c, c, c.* Epithelial pearls. The cells next to the basement membrane have stained more deeply.

thickened layers of squamous epithelium (Fig. 255), which spreads over the cervix, and projects into the vagina somewhat in the shape of a mushroom (Fig. 257). Solid masses of epithelial cells dip perpendicularly into the subepithelial tissue.

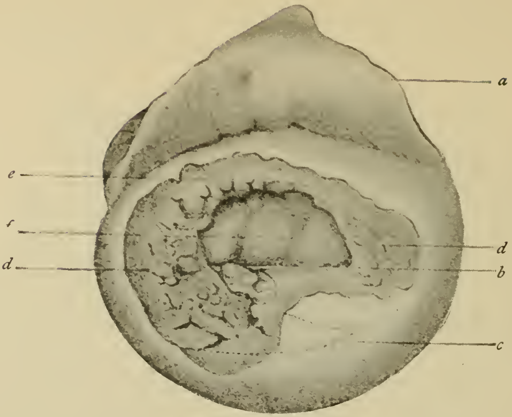


FIG. 260.—ULCERATING SQUAMOUS-CELL CARCINOMA OF CERVIX. (*J. Williams.*)
a. Part of anterior vaginal wall. *b*. Os uteri. *c*. Dotted lines showing the carcinoma burrowing in the substance of the cervix. *d, d*. Carcinomatous ulcer. *e, f*. Anterior lip split into two layers.

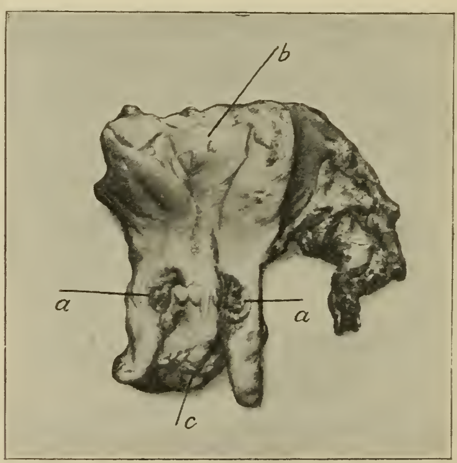


FIG. 261.—ULCERATING CARCINOMA OF CERVIX. (*Photographed from Author's Case soon after Removal of Uterus.*)
Anterior wall laid open through diseased area. *a, a*. Diseased area extending almost through the cervical wall. *b*. Cavity of corpus laid open. *c*. Slightly eroded external os.

There is round-cell infiltration and an abundant growth of connective tissue about them. As the papillæ enlarge, the surface epithelium breaks down over them and leaves a rough, granular, fissured surface of a dirty grayish color, resembling that of a dirty cauliflower. It is covered by a sticky, grumous discharge, composed largely of cell débris, which can be pressed out of the surface in tiny white threads of greasy or caseous-looking matter. The disease remains for a long time confined near the surface, and spreads around the cervix and to the vaginal surface, and finally to a slight distance into the substance of the cervical walls.

Epithelial surface.

Discharge.

Extension.

There is an ulcerating form of squamous-cell epithelioma of the vaginal portion which begins as a thickening of the epithelium on the surface, and which breaks down and ulcerates before causing much infiltration beneath the surface. It corresponds to the flat ulcerating carcinoma of the skin.

4. Cylindrical-cell carcinoma of the cervix starts as a small nodule on the cylindrical epithelium of the cervical cavity or everted or eroded cervix.

Starting place.

When the condition originates upon the eroded vaginal portion, the cervix may enlarge somewhat, as in squamous epithelioma, but the tissues are more deeply infiltrated (Fig. 264).

On vaginal portion.

The disease may start upon the surface of the cervical endometrium, and the tissue break down and ulcerate early, without much infiltration of the walls excepting an area about the ever-increasing excavation (Figs. 261 and 262). More often the disease extends rapidly into the cervical walls (Fig. 264), producing a nodular or globular enlargement of the cervix (nodular cancer, parenchymatous carcinoma, atypic cancer). Sooner or later the surface ulcerates, and progressive excavation takes place.

Ulcerating variety.

Nodular variety.

Carcinoma of the cervical cavity seldom passes the external os until the cervix is very much enlarged or almost completely destroyed, but it sometimes passes quite early to the

Extension.

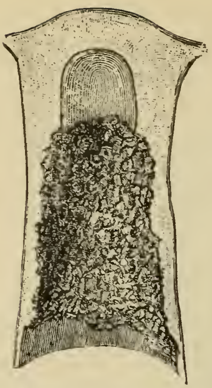


FIG. 262.—ADVANCED ULCERATING CYLINDRICAL-CELL CARCINOMA OF CERVIX. (*Winter-Richter.*)

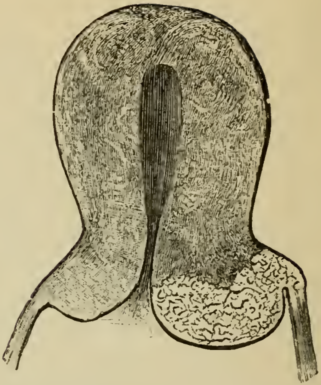


FIG. 263.—INFILTRATING CARCINOMA OF VAGINAL PORTION. (*Winter-Richter.*)

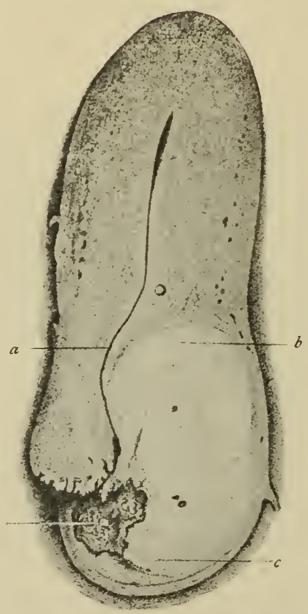


FIG. 264.—CYLINDRICAL-CELL CARCINOMA INFILTRATING CERVIX, WITH BUT LITTLE ULCERATION. (*J. Williams.*)

a. Cervical cavity, distorted. *b*. Upper end of carcinoma. *c*. Lower end of infiltrated cervix. *d*. Carcinomatous ulcer.

body of the uterus. The connective tissue about the cervix is affected quite early, a fact which renders this form of carcinoma the most malignant of all uterine cancers (Fig. 265). Malignancy.

5. When the disease begins on a part of the vaginal portion affected with papillary erosion and pseudoglandular or follicular formation (part VII, chap. VII, par. 2; Figs. 198 and 199), the single layer of cylindrical epithelium on the surface and Minute anatomy when cervix eroded.

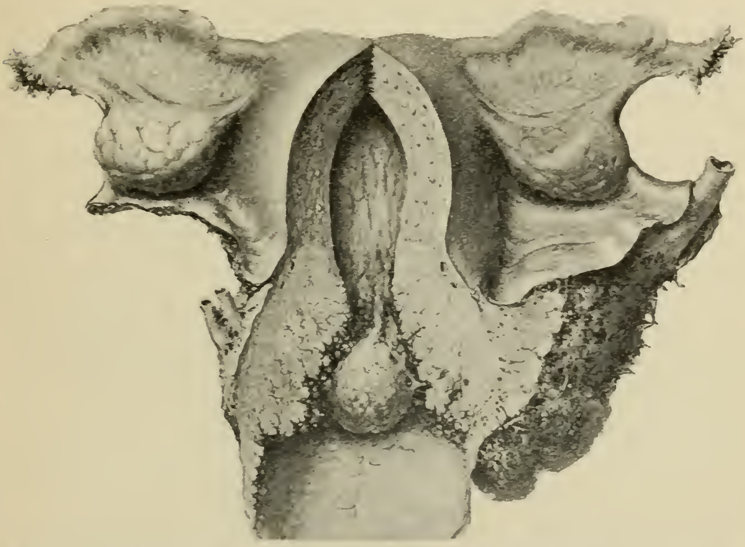


FIG. 265.—CYLINDRICAL-CELL CARCINOMA OF THE CERVIX, EXTENDING INTO PARAMETRIUM ON THE RIGHT. (*Russell.*)
The ureter is enlarged in connection with hydronephrosis caused by pressure of the growth.

in the false glands becomes multiple and polymorphous in character. The cell proliferation and gland formation, with the accompanying round-cell infiltration, extends down into the tissues. As the disease advances, the lumina of the false glands are filled with solid masses of cells, which break through into the surrounded tissues. The condition then can not be differentiated from an original squamous-cell carcinoma which sends solid masses of cells into the tissues (Ruge).

When cervix everted.

6. When the cylindrical epithelium of the cervical cavity or everted cervix is attacked, the same proliferation and polymorphism of cells, with penetration into the submucous tissue as described in the preceding paragraph, may take place. Some glands within the diseased area are unaffected by this change, and perish in the general destruction of tissue without participation in it. Many layers of epithelium form on the inner surface of the gland before it is finally completely filled and obliterated. The free surface is more or less uneven, and papillary in character. This form has been called adenocarcinoma, or glandular carcinoma, and is the one most commonly found in the cervix.

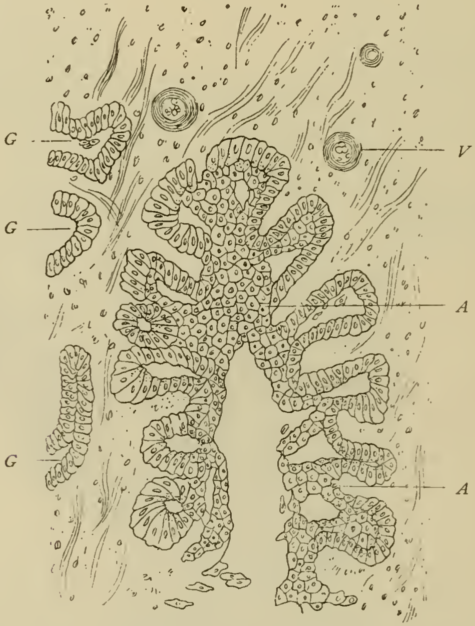


Fig. 266.—Microscopic Section of Commencing Cylindrical-cell Carcinoma of Cervix. (*Bonnet et Petit.*)

A, A. Typical transformation of epithelial covering of the arbor vitæ. *G, G, G.* Normal glands. *V.* Vessels.

Uneven surface.

Adenocarcinoma.

In some cases the surface proliferation is abundant and forms a smooth covering, while the epithelial cells penetrate the tissues in solid masses. This is apt to be the case when the mucous membrane is everted. The advanced stages do not differ, however, from those above mentioned. Smooth surface.

7. When the disease affects a badly inflamed cervical cavity or everted cervix, a condition called malignant adenoma may result. (Figs. 283 to 285.) The glands proliferate as fast as the epithelium, which still covers them with a single layer. They elongate, branch out, widen, and bend and fold in various shapes, crowding and filling the tissues in such a way that the irregularities of the different glands fit into each other without interfering much with the integrity of the stroma. The cells retain their cylindrical character, although the folding of the glands may compress them laterally at the base or at the apex and render them a little slimmer toward one or the other end. The nuclei are situated at or near the center of the cells. Malignant adenoma. Glands. Cells. Nuclei.

Proliferation of cells, producing several layers of polymorphous cells that break through into the connective tissue, may take place in the later stages, or comparatively early when malignant adenoma and the other forms of glandular carcinoma are mixed. Mixed form.

A secondary deposit may occur in the cervical walls from a primary focus in the uterus or in the tissues around the uterus.

8. In the advanced stages it may be difficult to recognize the variety. The necrosis of tissue, particularly in cylindrical-cell carcinoma, may open the rectum, bladder, or both, and convert almost the whole pelvis into one open cavity. The surrounding lymphatics are involved, and the pelvic connective tissue becomes filled with cancerous tissue. The ureters often become compressed and sometimes ulcerated, and hydronephrosis, nephritis, and uremia result. The peritoneal cavity is seldom opened, because, as soon as the peritoneal Destruction of tissue. Extension. Ureters compressed. Uremia. Peritoneum.

surface becomes involved, the general cavity is shut off by adhesions. The ovaries, Fallopian tubes, and fundus uteri may finally all become affected. The endometrium is usually inflamed, and stenosis of the cervix, with hematometra or pyometra, is occasionally observed.

Uterus and adnexa.

Duration.

The cylindrical-cell variety runs its course, as a rule, in from one to two years; the squamous-cell variety may take a little longer.

Predisposing.

9. **Etiology.** The prolonged irritation and pathological changes following laceration of the cervix predispose the parts to carcinoma, although the persistent and unlimited proliferation of epithelium indicates that the cause is specific and self-perpetuating.

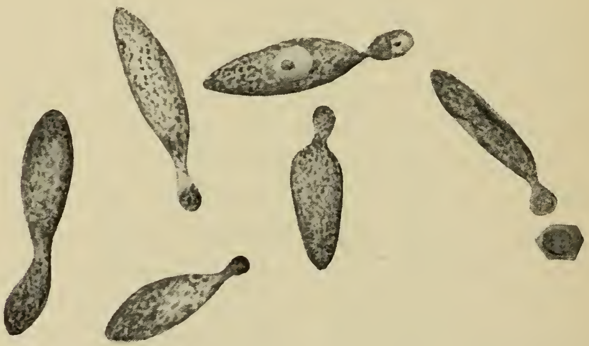


FIG. 267.—MICROBES FOUND IN UTERINE CARCINOMA (*Vitalis Mueller.*)

Parasites.

Recent investigations point to a microparasitic origin. Vitalis Mueller has found micro-organisms of various shapes in uterine carcinoma, but none has been demonstrated to be characteristic. (Figs. 267 and 268.)

Not characteristic at first.

Discharges leukorrheal and bloody.

10. **Symptoms.** It should be remembered that carcinoma often exists for some time before symptoms appear. When they do appear they are not at first characteristic. A slight increase of the menstrual discharge and some leukorrhea, and

later a slight occasional bloody flow are the earliest. In some cases the first symptom is a slight flow of blood after coitus ; in others, hemorrhages do not occur until the disease is far advanced.

11. Soon after the intermenstrual hemorrhages have commenced the vaginal discharge grows thinner and more abundant, and the somewhat disagreeable odor, that may have been already noticed, becomes the same as that of decomposing meat. The presence of minute particles of broken-down tissue, and pus or blood débris, give it a color varying from light-gray and yellow to dark-green or brown. A dish-water appearance is quite common. Later it assumes more of a bloody character, or alternates with discharges of blood.

Hemorrhage.

Offensive discharge.

Dish-water appearance.

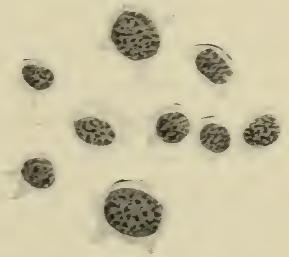


Fig. 268.—Other Microbes Found in Uterine Carcinoma. (*Vitalis Mueller.*)

12. Irritation of the vaginal entrance by the discharges may become troublesome. When the connective tissue around the cervix is invaded, shooting, lancinating pains come on, and soon recur daily with increasing severity. They may radiate into the iliac, inguinal or gluteal region, or down the thigh. Still later the pains of peritoneal inflammation, with fullness of the lower abdomen and rigidity of the abdominal walls, supervene. If stenosis of the cervix is produced, colicky uterine pains will follow. As the neighboring organs become affected, symptoms of inflammation in them become prominent, such as dysuria, polyuria, vesical tenesmus, constipation, rectal tenesmus, mucous discharges from the rectum, and septic diarrhea.

Irritation.

Pain.

Radiating.

Peritoneal.

Colicky.

In neighboring organs.

13. Indigestion, anemia, and septicemia gradually make themselves evident, giving the patient a cachectic appearance. The skin is yellowish, dry, and often wrinkled, the sclerotic and conjunctiva are pearly white, and the expression of the

Cachexia.

Uremia. face is dull. Uremia may develop gradually and render the patient stupid, and benumb her sensibilities so that she scarcely realizes her terrible condition.

Modes of death. Hemorrhages, peritonitis, uremic coma, and gradual failure of the vital powers are the ordinary modes of death.

14. **Diagnosis.** The diagnosis, to be of benefit to the patient, must be made early.

Early appearance. *Squamous-cell carcinoma* is known in the beginning by the appearance of a dark-red livid spot on the vaginal portion that bleeds readily when rubbed. Development. As it develops, it projects from a broad base, and presents a rough, irregular, hard, and friable surface, somewhat like that of a raw cauliflower. Moisture. It is usually moistened with a mucopurulent, foul-smelling fluid. Erosion, etc. An enlarged, hardened cervix, with erosion and cystic degeneration, is smooth and shiny, and feels more or less elastic. It does not crumble when scratched, as does the cauliflower growth.

Before ulceration. The non-ulcerated diseased surface of squamous-cell carcinoma has a congested, bluish-red color with light gray patches scattered over it, corresponding to conglomerations of cells ready to break through. After ulceration. The ulcerated portion has sharply-defined vascular edges and a dull, mottled, granular-looking surface, which is irregularly fissured, with yellowish-gray areas interspersed with red vascular spots containing visible blood-vessels. One or more of these vascular spots becomes bloody when the parts are wiped off. In advanced cases a cheesy cell-débris can sometimes be made to exude by pressing upon the surface.

It has, on account of its hardness, been mistaken for a large, ulcerated or sloughing myoma of the cervix. But a large, cervical myoma is not so rough, hard, and friable ; it is smooth, more or less elastic to the touch, and will not crumble on the surface even under firm pressure. It is tougher of fiber and more elastic, but does not feel so hard upon gentle palpation.

A large, sloughing, intra-uterine myoma protruding through the dilated cervix simulates carcinoma, but this kind of myoma has an additional characteristic that clears the diagnosis, viz.: the thin rim of the dilated cervix around its upper part. On the other hand, the undilated os can be found within the area of the malignant cauliflower growth. (Figs. 256, 257, 270, and 272.)

Bilateral laceration of the cervix, with erosion and eversion of both lips (Fig. 269), gives the cervix a somewhat mushroom shape, but the edges are thinner than those of carcinoma, and the projections are in front and behind, with lateral depressions corresponding to the laceration. Fissures due to multiple lacerations are more regular, and extend from within the cervix outward, instead of in all directions. Carcinoma is on one wall or extends part way round, displacing the os from the center, and is not as soft nor of as dark a red as the eroded cervix.

Like inflammation.

Normal vaginal portion.

Sound.

15. *Cylindrical-cell carcinoma* without infiltration does not differ in appearance from severe cervical endometritis until commencing necrosis of tissue and ulceration occurs. Even when the cervix is excavated the vaginal portion may appear normal, excepting a narrow line of vascularity at the edge of the external os, and the thickening of the supravaginal portion may be inconsiderable. The sound introduced detects the excavation and brings out the characteristic foul-smelling discharge or débris, or starts a hemorrhage.

From fibroid.

Capsule.

Friability.

Vascularity.

Ulcer.

16. When the cervix becomes infiltrated and nodular or globular before ulceration becomes visible, the condition may be mistaken for a cervical myoma. A myoma, which always has a capsule, is not felt to be so intimately blended with the mucous membrane over it, and is not surrounded by vascular tissue as carcinoma is apt to be. The finger, in the latter condition, feels as if it were passing over a solid piece of india-rubber. The friability and vascularity, which are not detected by the finger, are easily made apparent by hooking a tenaculum into the nodule. It will immediately tear out, and cause abundant bleeding from carcinomatous tissue, but will hold firmly in a myoma. Later the surface assumes a pale or pinkish red, sometimes granular, appearance, and is soon converted into a fissured, irregularly excavated ulcer (Fig. 264, *d*),

with abrupt edges, which varies in color in different parts from dark-red to gray. Streaks or patches of fibrinous exudate are sometimes found on the ulcer.

The enlargement usually extends above the vaginal junction. A supravaginal globular thickening of the cervix that does not interfere with the passage of the sound in a person over thirty years old is nearly always due to nodular carcinoma. A supravaginal cervical myoma which does not interfere with the cervical cavity projects more distinctly upon the peripheral cervical walls (Figs. 271 and 273).

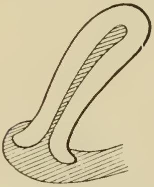


Fig. 269.—Relation of Os and Vaginal Fornices to Lacerated and Everted Cervix.

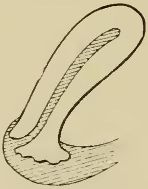


Fig. 270.—Relation of Os and Vaginal Fornices to Squamous-cell Carcinoma of Vaginal Portion.

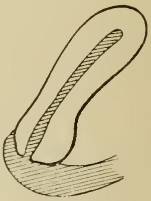


Fig. 271.—Relation of Os and Vaginal Fornices to Infiltrating Carcinoma of Cervix.

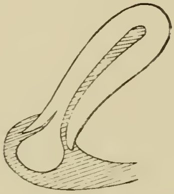


Fig. 272.—Relation of Os and Vaginal Fornices to Projecting Uterine Myoma.

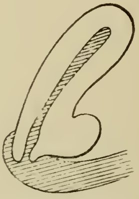


Fig. 273.—Relation of Os and Vaginal Fornices to Supravaginal Cervical Myoma.

Certain early symptoms point to carcinoma. Thus, the return of a bloody flow from the uterus some years after the menopause; hemorrhage after coitus from a uterus supposed to be healthy; the steady recurrence of slight hemorrhages at frequent intervals between menses, and without apparent cause, in a woman over thirty years old. On the other hand, extreme youth, or a continuance of the condition for two years or longer without getting much worse, would almost exclude cancer.

17. Cylindrical-cell carcinoma of a lacerated everted cervix

From erosion.
Color.
Firmness.
Nodules and follicles.
Suspicious signs.

is to be differentiated from erosion with enlargement. The surface over infiltrating carcinomatous tissue without ulceration is more yellowish in color than the deeper red erosion, and may be covered with glistening bright red granules (Stratz). The surface in the condition of erosion is velvety or elastic, instead of hard and board-like or friable. If nodules are felt, or lighter-colored elevations like superficial cysts are seen, they should be punctured to ascertain whether they are follicles or solid carcinomatous nodules. In the first condition a thick mucus will be expelled ; in the latter brisk hemorrhage will ensue. Cystic follicles of appreciable size are seldom found within the diseased area of carcinoma. However, an angry looking, indurated, sharply defined spot upon an enlarged cervix, that bleeds easily and can not be traced to cystic degeneration, should be suspected, and some of the tissue be examined microscopically.

Extension.
Cervix fixed.
Lymphatics.
Adherent appendages.
Connective tissue free.

It is important to determine whether the malignant disease has passed into the surrounding connective tissue. When the cervix is fixed in the pelvis, or hard tissue can be felt extending from the cervix toward the pelvic wall, such is usually the case. Palpation per rectum reveals the enlarged lymphatics, or the solid masses extending from the cervix. The bimanual rectal examination sometimes enables us to detect adherent appendages on the sacro-uterine and broad ligaments, and at the same time establish the freedom of the connective tissue around the cervix from infiltration, even when the uterus is more or less fixed by these old adhesions. The passage of a whalebone guide or spiral sound (Figs. 33 and 34) into the ureter aids materially in locating the diseased areas. If the bladder be invaded the cystoscope will reveal a congested corrugated appearance of the affected portion (Winter).

Squamous-cell.

18. The **prognosis** of a squamous-cell carcinoma is good if properly treated before it has extended to the vaginal walls.

After that a permanent cure can seldom be effected. In the cylindrical-cell varieties the prognosis is usually bad. Could the disease be discovered more often in the earliest stages, *i. e.*, before the symptoms appear, it would usually be possible to remove all of the affected tissue. When the pelvic connective tissue or lymphatics are invaded, or when the entire thickness of the cervix is involved, a permanent cure can not be expected until some specific for cancer shall have been discovered.

Cylindrical-cell.

Early discovery.

Surrounding tissues invaded.

19. The **treatment** generally recommended at the present day consists in total extirpation of the uterus by way of the vagina. A few authorities (C. Schroeder, M. Hofmeier, Reeves-Jackson, W. H. Byford, and others) have maintained that in the early stages of squamous-cell carcinoma high amputation is not only less dangerous, but fully as effective, since the disease does not spread toward the uterine cavity. If the patient is watched a return of the disease in the uterine cavity can be discovered in time to cure the patient by a hysterectomy. The chance of a return in that cavity is very slight, and when it does it remains localized in the uterus until an advanced stage.

Total extirpation.

High amputation of cervix.

20. *High Amputation of the Cervix.* The steps of high amputation of the cervix for beginning squamous-cell carcinoma are as follows :

The patient is prepared in the ordinary way (part I, chap. II). She is placed in the dorso-sacral posture (Fig. 3). The vagina is thoroughly douched with a 1 : 2000 solution of corrosive mercuric chlorid, and the external parts, from which the hair has been clipped, are scrubbed thoroughly with soft soap, then with alcohol, and finally with the corrosive chlorid. The vagina is held open by retractors, the cervix grasped by vulsella, the cancerous tissue curetted away, and the resulting wound disinfected with strong carbolic acid. The vagina is then scrubbed with soft soap and again douched out with the

Steps.

Posture.

Douche.

Vulva.

Curettage and disinfection.

Vagina.

corrosive mercuric chlorid solution. The uterine cavity is now gently curetted with a sharp curette, douched out with sterilized water, swabbed out with strong carbolic acid, and again douched out with plain sterilized water.

Uterine cavity.

A curved incision is then made, anteriorly and laterally, a little over half way around the cervix on the vaginal wall, about ½ of an inch (1.5 cm.) away from the diseased tissue (Fig. 274). While the cervix is pulled down as near the vaginal entrance as possible, the bladder is separated from the uterus by the finger nail or knife-handle for ½ or ⅔ of an inch, or two cm. The incision is then carried completely around the cervix posteriorly, and the connective tissue separated from the posterior surface of the cervix for about the same distance upward. If the peritoneal cavity is opened, it is immediately closed with a continuous catgut suture. The connective tissue is then snipped on either side with scissors almost to the point where the uterine artery can be felt beating. With an aneurysm needle a ligature of medium-sized silk is carried through the connective tissue above the artery, from before backward, and brought out, guided by the forefinger of the left hand placed behind the artery. The artery is then tied and the thread cut short. The other side is similarly tied, and the tissues between the ligatures and the uterus severed as high as the separation has been carried anteriorly and pos-

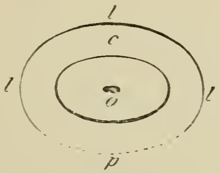


FIG. 274.—HIGH AMPUTATION OF CERVIX. (Schematic.)

o. External os uteri. *c*. Circumference of cervix. *l*, *l*, *l*. Anterior vaginal incision (heavy line). *p*. Posterior vaginal incision (interrupted line).

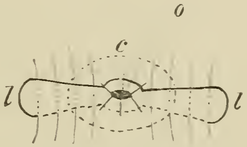


FIG. 275.—CERVIX AMPUTATED. (Schematic.)

Vaginal edges united to the endocervical mucous membrane. Lateral sutures passed but not tied.
Same lettering as preceding figure.

Incision.

Bladder

Incision.

Connective tissue.

Peritoneal cavity.

Sides.

Ligation of uterine artery.

Other vessels. teriorly. If any vessels about the sacro-uterine or broad ligaments bleed, they should be caught with forceps and tied with Amputation. fine catgut. The cervix is now cut squarely off as high as liberated from the surroundings.

After all active hemorrhage is checked, the wound is Disinfection douched out with the corrosive mercuric chlorid solution, and Suturing edges. the middle of the anterior vaginal edge is united to the mucous membrane of the cervix by two or three silkworm-gut sutures, which gather up any loose connective tissue under them and take a small hold on the cervical tissue next to the mucous Sides. membrane. The same is done posteriorly. The gap left on either side between the vaginal edges is then closed with silkworm-gut or catgut sutures, which also pass superficially through the exposed surface of connective tissue (Fig. 275).

Douche. 21. The vagina is douched out with the 1 : 2000 solution Packing. of corrosive mercuric chlorid, and loosely packed with strips of iodoform gauze about two inches (five cm.) wide. The gauze Removal of gauze. Douche. should be removed on the third day, and a vaginal douche be given of the corrosive chlorid solution, followed by one of sterilized water, twice daily.

Urine. The patient should urinate or be catheterized every six or eight hours, and the vulva and vaginal entrance be immediately washed off. If the patient can not urinate lying down, she should be catheterized for forty-eight hours, but after that Sutures. may be raised to a sitting posture on a bed-pan. The sutures should be left for two weeks.

The instruments needed are vaginal and perineal retractors, long-handled scissors (sharp-pointed, and curved on the flat), a knife, an aneurysm needle, vulsella to hold the cervix, two tenacula to hold the stump and hook down the vaginal edges, sponge holders, a sound for the bladder, needle forceps, half-curved needles about an inch, or a little over two cm., long, silk, and silkworm-gut.

A silk suture through the lower end of the cervix can be advantageously made to take the place of the vulsella when the vaginal entrance is narrow. If the sacro-uterine ligaments prevent the cervix from being brought down, their lower edge can be ligated after the ligation of the uterine arteries, and the uterus be severed from them.

22. For advanced squamous-cell and all cases of cylindrical-cell carcinoma, total hysterectomy is, according to our present knowledge, the only treatment. Vaginal hysterectomy is usually preferred, although the abdominal method enables us to remove more of the tissues about the uterus, and is sometimes selected for advanced cases. Were it not more dangerous, the latter would always be the operation of election.

23. *Vaginal Hysterectomy.* The steps of total extirpation of the uterus per vaginam for carcinoma of the cervix are as follows: **Steps.**

Preparation. The patient is prepared for a peritoneal section (see part I, chap. II and III). **Disinfection.** The final disinfection on the operating table is the same as for high amputation (par. 20), excepting uterine curettage. **Vaginal incision, etc.** The same vaginal incisions are made, but the bladder is separated until the peritoneal cavity is opened widely. **Culdesac.** The separation of tissue behind the cervix is continued until the culdesac of Douglas is opened, when a **Sponge.** sponge as large as a goose egg, or larger, and attached to a string, is pushed into it.

Uterine artery. The ligation of the uterine artery (par. 20) is guided by the finger in the peritoneal cavity behind the broad ligament, and is done as near the ureter as possible, the latter being pushed toward the side of the pelvis. If the disease is far advanced, a whalebone ureteral guide or spiral sound (Figs. 33 and 34) may be introduced into the ureter to locate it. **Left side.** The ligature passes backward through the left broad ligament into the peritoneal cavity, and when brought out below includes also **Sacro-uterine ligament.** the sacro-uterine ligament. After being tied, the same thread **Broad ligament.** is again carried through the broad ligament higher up, tied again, and the tissues are cut between the ligature and the uterus. **Right side** The right broad ligament is similarly tied and cut in sections until the uterus on that side is entirely separated. Remaining part. Then the fundus is pulled down, and the remaining upper portion of the left ligament is tied and severed, and the uterus removed. Peritoneal and vaginal edges. The anterior and posterior peritoneal edges are drawn over the connective tissue with a tenaculum, and stitched to the vaginal edges respectively with a continuous catgut suture, so as to cover the raw tissue and check the bleeding from it. Angles. Oozing from the lateral angles is similarly checked with catgut sutures. The blood is sponged out, and Peritoneal cavity. the pelvic peritoneal cavity thoroughly irrigated with a 0.6 per cent. solution of chlorid of sodium in sterilized water. Stumps. The stumps are now pulled down by means of the long ligatures, and sutured extraperitoneally to the vaginal edges, Cavity. either so as to close the peritoneal cavity, or (as I prefer) united to each other in the vaginal wound without entirely closing the cavity. Vagina. The vagina should be loosely packed with Gauze. strips of iodoform gauze, five cm., or two inches, wide, the ends of which, if the peritoneal cavity be not closed, extend between the vaginal edges as far as the constricted portions of the stumps. The gauze is left in place four days. The Ligatures. ligatures may be allowed to slough off. When silk is used, the stumps will slough off in about two weeks; when catgut is used, the sloughing and ulceration are less, but last nearly as long.

Urination. 24. The patient urinates or is catheterized every six or Position. eight hours, and is kept on her back for forty-eight hours, when she may be allowed to lie in any position. After the Douches. gauze is removed the vagina is douched twice daily with a one per cent. carbolic, or creolin, or lysol solution. The diet Diet. is the same as after other peritoneal sections (see part I, chap. VI). Early in the third week the patient may eat her Sitting up. meals with a bed-rest, and toward the end of it may sit up out of bed a short time each day.

Forceps. 25. When the vagina is small and the uterus can not be pulled down, it may be impossible to tie the broad ligaments securely, or to tie them quickly enough. In such cases they may be rapidly clamped with forceps. A short strong pair is put on the base of the broad and sacro-uterine ligaments, on each side, and the tissues cut as high as the forceps reach. A long pair of broad ligament forceps is placed upon the remain-

Base of broad ligaments.

Remainder.

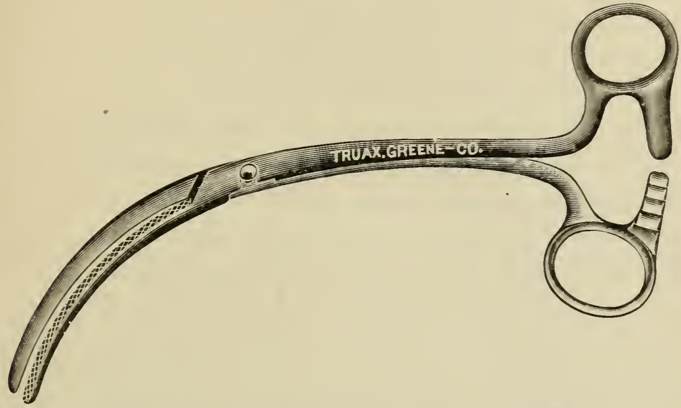


Fig. 276.—Broad Ligament Forceps. The Author's Model.

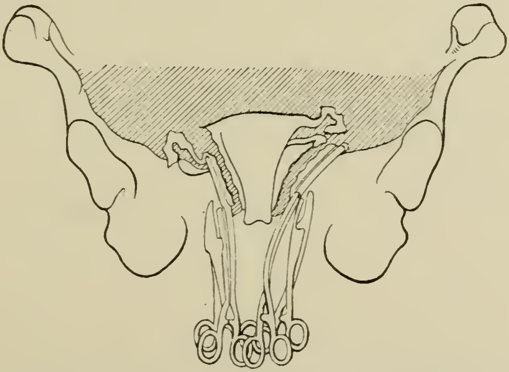


Fig. 277.—Forceps Applied to Broad Ligaments, and Uterus Cut Loose. On the right the tube and ovary are supposed to be removed with the uterus, on the left the tube and ovary are not to be removed.

der of one side and the uterus cut loose on that side. Another pair is placed on the other side, the ligament severed, and the uterus taken away.

Position of packing.

The gauze packing should extend into the bottom of the culdesac of Douglas and up along the stumps, but not beyond them, nor between intestinal loops.

Omentum.

In both methods the omentum, if within easy reach, should be pulled down between the stumps and intestines to prevent the formation of intestinal adhesions.

Removal of forceps and gauze.

The forceps should be taken off in forty-eight hours, but the gauze be left for four days. In other respects the case may be treated as after ligation.

Operation with ligatures leaves the parts in better condition for recovery after the operation ; operation with forceps, is quicker, and thus easier both for the surgeon and patient, but does not leave the parts in as good a condition for subsequent recovery. After beginning with ligatures it may be necessary to finish with forceps. The presence of forceps is usually a great trial to the patient.

The instruments required are: One perineal and two vaginal retractors, a knife, a pair of long-handled scissors, an aneurysm needle, a sound for the bladder, several hemostatic forceps, vulsella, broad ligament forceps, sponge holders, a needle-holder, short straight or half-curved needles for suturing of oozing surfaces, and a tenaculum. Iodoform gauze, irrigating bags, plain and antiseptic solutions, etc., should be provided as for other peritoneal sections.

26. *Abdominal total extirpation* of the uterus for cancer of the cervix (Freund's operation) may be performed as follows :

Posture. Intestine.

Put the patient in Trendelenburg's posture, make a median line incision, push the intestines out of the pelvis and cover them with large flat gauze sponges that are attached by hemostatic forceps to the edges of the incision. Double ligate the

Spermatic arteries. Bladders.

spermatic arteries and cut between them. Separate the bladder from the uterus. Pull the round ligament forward and the Fallopian tube backward ; cut between them into the broad ligament, and find the ureter and uterine artery. Hold the ureter by a blunt hook in such a way that the uterine artery can be ligated 2½ cm., or one inch, from the uterus and outside of the vaginal branch. Kelly introduces bougies into the ureters before beginning the operation to indicate their position. Altuchoff claims that forward traction on the round ligament pulls the artery away from the ureter, so that it can be ligated without danger of wounding the latter. Ligate, and sever the broad ligament as near the pelvic wall as possible, and down to the cancerous area. Treat the other broad ligament in the same way. Draw up the uterus, cut into the vagina with scissors (preferably in front) and cut out the cervix, removing the vaginal wall for ½ of an inch or more from diseased area. Bleeding vessels should be ligated, or the vaginal edges sewed up with catgut. Pack the vagina with iodoform gauze, and sew the peritoneal edges together over it. If the glands along the iliac vessels, or elsewhere are enlarged, they should be carefully enucleated (Ries). Wash out the pelvic cavity before allowing the intestines to return to it. Unless there be oozing in the pelvis, close the incision without drainage.

Ureter and uterine artery.
Hold ureter.
Bougies.
Traction on round ligament.
Ligating.
Cut into vagina.
Remove cervix.
Vaginal wall.
Vessels, etc.
Vagina.
Glands.
Toilet.
Drainage.

Instruments: Scalpel, scissors, several long and several short pairs of hemostatic forceps, tenaculum forceps, tenaculum grooved director, blunt hook, tissue forceps, retractors, sponge holders, needle-holder, needles, suture material, large and small sterilized gauze sponges, gauze strips for packing, dressings, hypodermic syringe, etc.

27. The palliative treatment is the same as that of cancer of the vagina.

Cancer of the cervix *complicated by pregnancy* calls for a vaginal hysterectomy when the uterus is small enough to be thus removed. If the pregnancy has gone so far that such is impossible, abortion may be induced and the uterus be extirpated per vaginam as soon as emptied. When the fetus becomes too large, or the cervix too extensively diseased for delivery through the cervix, and the uterus too large for a vaginal hysterectomy, total extirpation by abdominal section is indicated.

After viability a Cesarean section, which has a lower mortality than Porro's operation (supravaginal hysterectomy), is the best procedure, and in case the disease is confined to the uterus, it should be removed *in toto*. If the state of the patient is such that the hysterectomy must be postponed, it may be performed by the vaginal method later.

When the disease has advanced too far for radical treatment, the pregnancy should be allowed to go to term and the child be delivered by Cesarean section.

If the pregnancy has begun after the disease is far advanced, and there is no hope of the development of the fetus to the viable condition, it is better to induce abortion as soon as possible. Incisions in the healthy portion of the cervix may be made to facilitate the delivery.

CHAPTER IV.

CARCINOMA OF THE CORPUS UTERI.

Rarity. 1. Carcinoma of the body of the uterus is a rare disease, and usually appears at or after the menopause. It may take the form of a diffuse growth of villi covering the entire endo-

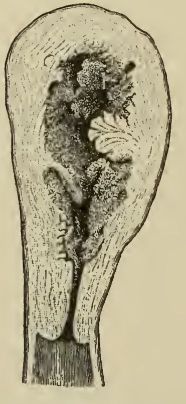


FIG. 278.—DIFFUSE CARCINOMA OF THE ENDOMETRIUM. (*Winter-Richter.*)

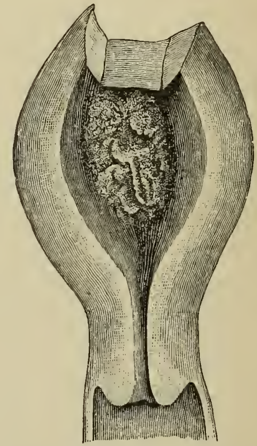


FIG. 279.—CIRCUMSCRIBED CARCINOMA OF THE ENDOMETRIUM. (*Winter-Richter.*)

Age.
Three forms.

metrium, or of a circumscribed projecting mass, or it may develop upon a polypus.

2. **Pathology.** Three varieties, a cylindrical-cell carcinoma (adenocarcinoma), a malignant adenoma, and a squamous-cell carcinoma, have been recognized.

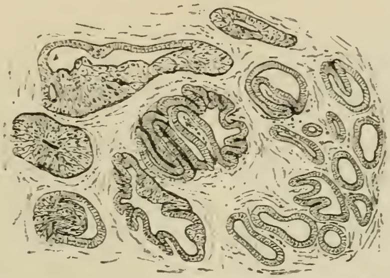


Fig. 280.—Microscopic Section of Adenocarcinoma of the Endometrium. (*Schroeder.*)

Villous form.

In the *cylindrical-cell adenocarcinoma* the microscope shows a proliferation of epithelial cells, as in adenocarcinoma of the cervix (chap. III, par. 4 to 7). The more muscular uterine walls possess greater resistance to carcinomatous infiltra-

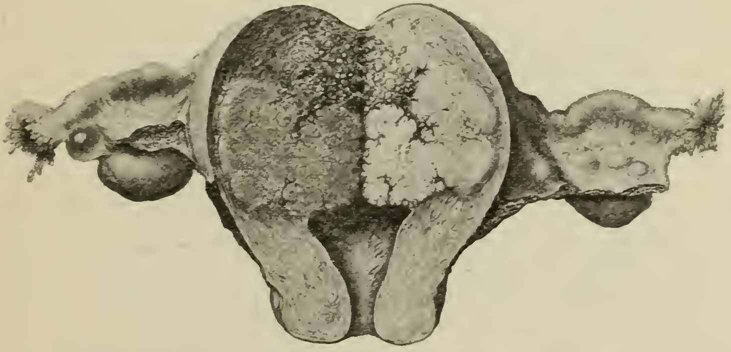


Fig. 281.—Advanced Adenocarcinoma of Corpus Uteri. (*Russell.*)
Showing infiltration of entire thickness of uterine wall, with subperitoneal nodules at the left uterine horn, three nodules in right broad ligament, and one in the round ligament. Cervix healthy.

Uterine walls.

tion than the walls of the cervix, and seldom become deeply affected until the endometrium is extensively diseased. Sooner or later the superficial tissues break down, and the uterus is converted into an ulcerating cavity.

Ulceration.

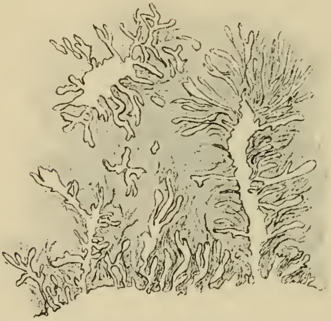


FIG. 282.—MALIGNANT ADENOMA OF ENDOMETRIUM. (*Ruge.*)
Extraglandular proliferation (everting), early stage. Low power.

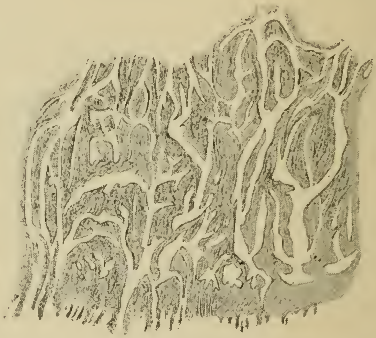


FIG. 283.—ADVANCED STAGE OF PRECEDING FIGURE. (*Ruge.*)
Low power.

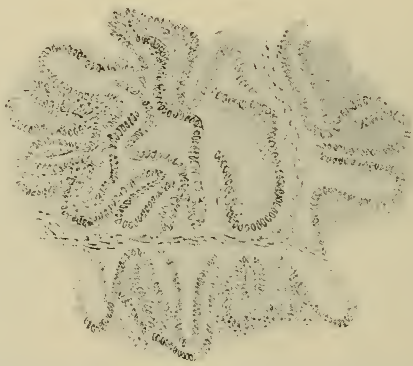


FIG. 284.—MALIGNANT ADENOMA OF THE ENDOMETRIUM, SHOWING BEGINNING ATYPICAL PROLIFERATION OF EPITHELIUM. (*Schoenheimer.*) × 115.

Malignant adenoma.

Cells.

3. **Malignant adenoma,** in addition to the lesions of chronic metritis, is composed of anastomosing tubules filled with cells. Two varieties are described by Ruge. In one the proliferating glands form folds and projections on their external

surface, as in malignant adenoma of the cervix, except that the arrangement is less regular (Fig. 282). In time the appearance of glandular structure is lost, the gland having by intercommunication been converted into a system of canals, (Fig. 283) giving a worm-eaten appearance under a low power. This is called the "everting" variety, with extraglandular proliferation. The other "inverting" variety is characterized by intraglandular proliferation. Projecting folds form in the lumen of the gland dividing it into many tubules. Finally the gland structure is lost, and a multitude of anastomosing tubules or

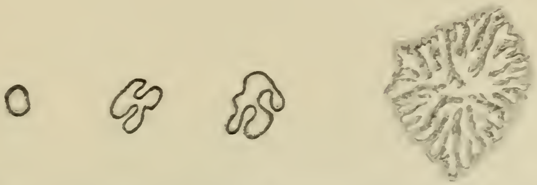


FIG. 285.—MOUTH OF UTERINE GLAND, SHOWING FOLDING IN (INVERSION) OF PROLIFERATING WALLS IN MALIGNANT ADENOMA. (*Ruge.*)

Alveoli.

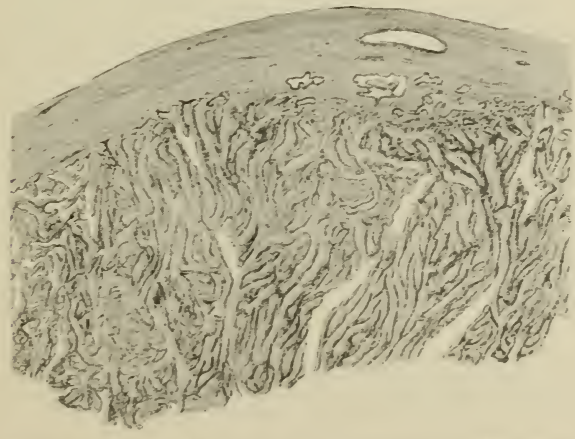


FIG. 286.—ADVANCED STAGE OF INTRAGLANDULAR PROLIFERATION (INVERTING) IN MALIGNANT ADENOMA. (*Ruge.*)
Vertical section. Low power.

double rows of cells remain, separated by thin layers of connective tissue (Figs. 285 and 286). A mixture of both of these types may exist. A transition into the ordinary glandular and alveolar structure takes place sooner or later.

Squamous-cell carcinoma.

4. **Squamous-cell carcinoma** may develop in the uterine cavity, particularly in those cases of endometritis in which the cylindrical epithelium of the endometrium has in part become transformed into pavement, or squamous, epithelium. It occurs as a primary growth, as an extension from the cervix, and as a metastatic deposit. (Fig. 287.) The surface of the affected parts exhibits a thick mass of pavement cells, which

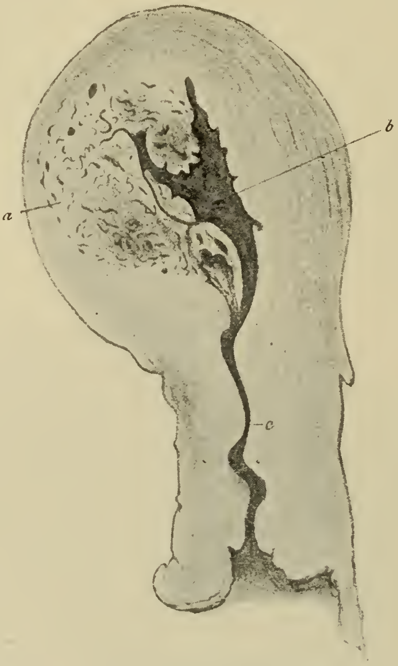


Fig. 287.—Section of the Uterus Containing Squamous-cell Carcinoma of the Endometrium. (*Flaischlein.*)
a. Squamous carcinoma of anterior wall. *b.* Pyometra. *c.* Lower border of pyometra.

Endometrium.

Origin.

Epithelial cells.

send large projections irregularly down into the deeper tissues, displacing and destroying them, and forming the characteristic cancer pearls. (Fig. 288.) The surrounding tissues are infiltrated with round cells. The cancerous projections undergo necrosis and give a papillary character to the surface.

Pearls.
Round cells.
Necrosis.

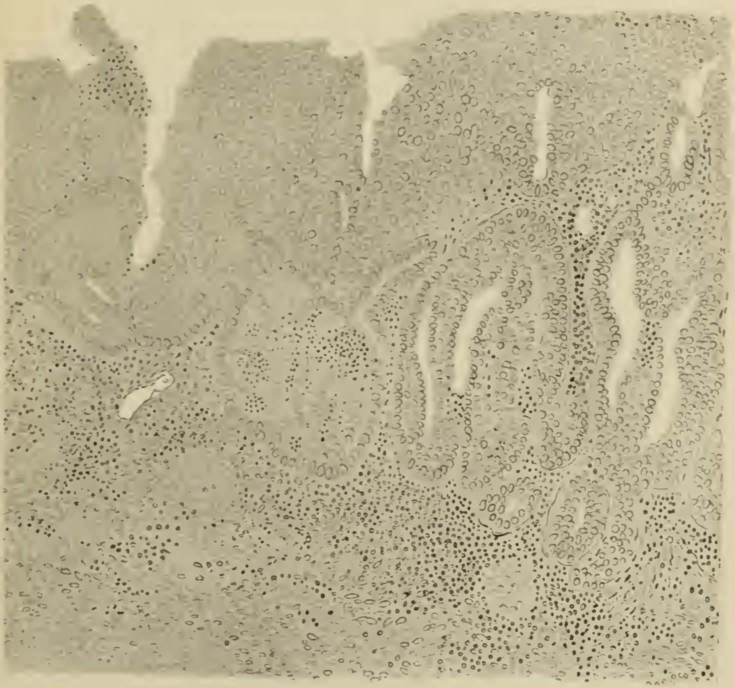


Fig. 288.—Microscopic Section of Squamous-cell Carcinoma of the Endometrium. (*M. Hofmeier.*)
The upper superficial portion represents the characteristics of squamous-cell carcinoma; that of the deeper portions, glandular carcinoma.

An extension of stratified epithelium into the uterine cavity has been observed in a few cases, and has been called *ichthyosis uteri* (Zeller, Ries, Gautier), or *epidermidalization* (Veit). When it does not pass beyond the entrance of the glands, it is deemed benignant; when, however, it penetrates the glands or uterine walls, it constitutes a carcinoma. Cases of epidermidalization do not necessarily result in carcinoma.

5. Another rare variety has recently been described. It consists of a proliferation of the epithelial cells of the placental part of the chorion; the portions affected are the syncytial and ectodermal layers (Marchand). It is composed of poly-

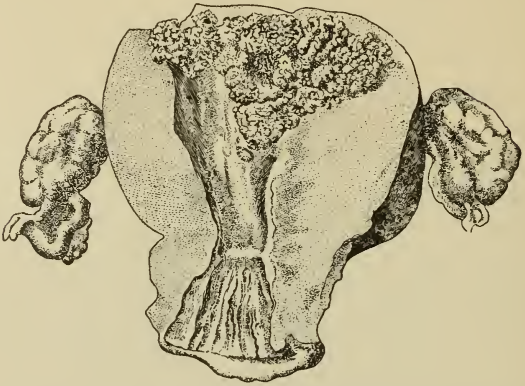


FIG. 289.—CARCINOMA OF THE CHORION (DECIDUOMA MALIGNUM) AT THE FUNDUS UTERI, A PORTION OF THE POSTERIOR WALL REMOVED. (*Gottschalk.*)

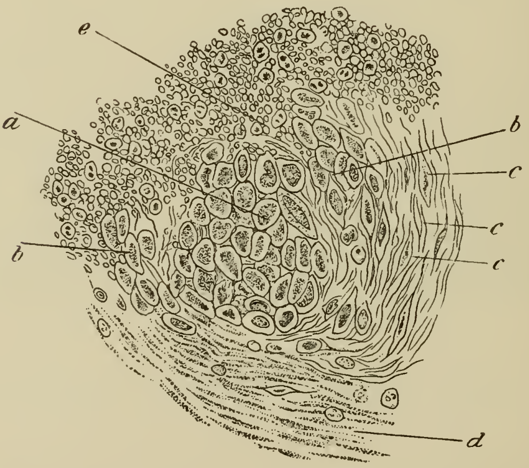


FIG. 290.—MICROSCOPIC SECTION OF CARCINOMA OF THE CHORION. (*Sanger.*)
a. Nest of giant-cells resembling decidua cells. *b.* The same in process of formation. *c.* Connective tissue. *d.* Muscular fibers. *e.* Extravasated blood.

morphous and giant epithelial cells imbedded in connective tissue. The structure has the appearance of multitudinous villosities proliferating without limit in all directions.

It shows itself at a variable time, usually within a few weeks, after labor or abortion, and is characterized by an enlarged subinvoluted condition of the uterus with profuse hemorrhages and, later, offensive discharges. Currettage brings away a large quantity of soft, placental-like tissue, which relieves the symptoms temporarily. But in a few weeks the hemorrhages and growth return, with pain and other symptoms of cancer.

The disease runs a rapid course, and metastases occur early and often in distant parts.

An appropriate name for the disease has not yet been decided upon, since the disease was at first supposed to be a sarcoma, and was called sarcoma deciduocellulare. Carcinoma syncytiale, deciduoma malignum, serotinal tumor, cancer of the chorion, have latterly been applied to it.

6. In all forms the underlying muscular tissue gradually becomes infiltrated as the disease advances, and metastatic nodules are formed in the walls and in the broad ligaments. When the disease reaches the peritoneal surface, adhesions and secondary growths take place in and among the surrounding organs. The cancerous changes do not pass the internal os until quite late in their progress.

Extension.
Uterine walls.
Broad ligaments.
Peritoneum.
Internal os.

7. Of the **causes** little more can be said than that the occurrence of carcinoma is favored by long-standing endometritis, particularly of the fungus or polypoid variety (adenoma), and that a microparasite is probably responsible for its development (Figs. 267 and 268).

Inflammation.
Microparasite.

8. **Symptoms.** The symptoms are hemorrhage and watery discharges, which soon assume a distinctly fetid odor, and become more or less purulent and mixed with granular débris.

Hemorrhage.
Discharges.

The pains and symptoms of uterine inflammation are often noticeable, and characteristic uterine colicky pains are apt to

Pains.
Inflammatory.
Colicky.

come on at irregular intervals after the uterine cavity has become filled with the mass of degenerated tissue. Later the Peritoneal. pains are peritoneal in character and almost constant. They Other regions. spread to the iliac, inguinal, and abdominal regions, and are accompanied by enlargement, tenderness, and rigidity of the lower abdomen.

General. The general symptoms are the same as those of carcinoma of the cervix (chap. III).

9. **Diagnosis.** In the early stages the diagnosis may be Difficulty. difficult, particularly if the hemorrhage and offensive discharge are late in showing themselves.

Cervix. The cervix appears normal at first, but in a few cases becomes dilatable to such an extent that the finger can penetrate and feel the soft tissue.

Corpus. The corpus uteri, as palpated bimanually, is larger and rounder than normal, and, if the disease has not deeply affected the uterine walls, often gives a characteristic soft-elastic sen- Sound. sation to the vaginal touch. The sound usually detects the softened mass and causes some bad-smelling particles and fresh blood to be expelled.

History. The age of the patient, the previous history, and the charac- Curette. ter of the tissue obtained by the curette, will differentiate abortion with retained secundines.

Later signs. In the later stages the fundus is fixed by peritoneal adhesions and exudate, and feels to the bimanual examination like a large, hard, irregularly-shaped tumor among the overlying and more or less distended intestines.

When the symptoms point to the disease, a sharp curette should be introduced and some of the tissue gently removed for microscopical examination. This should be done in all cases of hemorrhagic endometritis in patients over forty years old.

10. **Prognosis.** If the disease is discovered before the Good early. peritoneal surface or broad ligaments show signs of infection, the prospect of a cure may be considered as good.

Total hysterectomy.

Kraske's method.

11. **Treatment.** The only radical treatment is a total hysterectomy. This can usually be done by way of the vagina (chap. III, par. 23), but if not, by celiotomy or Kraske's sacral method. The latter is a very difficult and dangerous one, and should only be resorted to when vaginal hysterectomy can not be done or does not give access to the diseased areas.

Kraske's method consists in removing the coccyx and lower portion of the sacrum, pushing the rectum to the left, and opening the peritoneal cavity at the culdesac of Douglas.

Curetting is never curative, but may be resorted to as a palliative measure when, for any reason, the uterus can not be removed. The sharp curette should be used because it can be made to thoroughly remove the softened tissue without exerting much pressure, and therefore with less danger than with the dull curette of perforating the uterine walls, which are apt to be friable.

CHAPTER V.

CARCINOMA OF THE FALLOPIAN TUBE.

Rarity.

Age.

1. Primary carcinoma of the Fallopian tube was until recently scarcely recognized, but reports are becoming constantly more numerous of its discovery on the operating table. The labors of Orthmann, Fearne, A. Martin, and others, have finally given us some definite knowledge of the subject. It nearly always occurs near or after the menopause.

Unilateral.

Previous inflammation.

2. **Pathology.** Primary carcinoma has been found on one side in over three-fourths of the cases, and always in a tube that was, or had been, affected by inflammation of long standing.

Macroscopic appearances.

The disease always starts in the mucous membrane, is soft or medullary in consistence, and varies in size from a small excrescence up to 20 by 8 cm., or eight by three inches (A. Martin).

Two forms.

It may take a nodular form, starting as a single nodule, or a diffuse form, beginning as several small nodules extending through the tissues.

Microscopic character. Two forms.

Microscopically there are also two forms: a purely papillary structure similar to malignant adenoma of the uterus, and a papillary structure with alveoli, corresponding to cylindrical-cell or villous carcinoma of the endometrium (A. Martin).

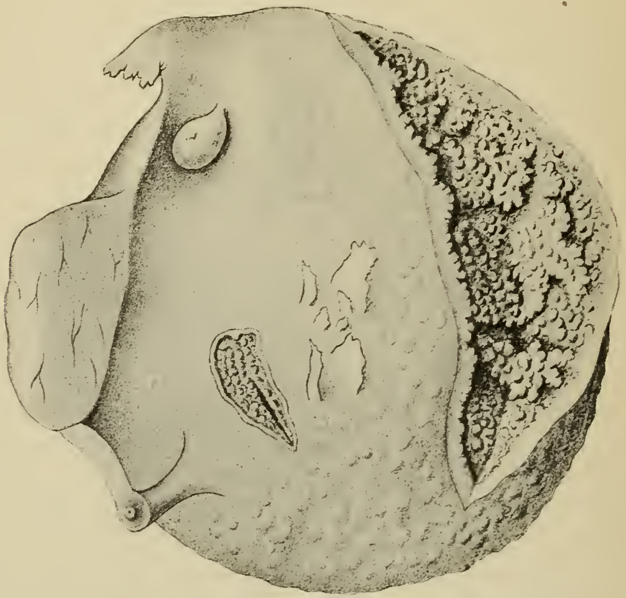


FIG. 291.—PAPILLARY CARCINOMA OF THE TUBE. ONE-HALF SIZE. (*Eckardt.*)
Ovary to the left, with fimbriated end of tube above it and isthmus below. To the right a piece is cut out for inspection.

Complications.

Salpingitis, ovaritis, local peritonitis with ascites, and ovarian tumors are apt to complicate the condition.

Inflammation.

3. **Symptoms.** The symptoms are those of salpingitis and pelvic peritonitis, particularly a return of them at or after the menopause, or after a long period of relief. The presence of cyst formation may give rise to the physical signs of ovarian tumor. Pelvic pain that may be worse before the menstrual period,

Cyst formation.

Pain.

ascites, occasional or constant watery uterine discharge of pinkish or brownish color, and the general symptoms of malignant disease, are ordinary symptoms. Pelvic hematoma or fatal intraperitoneal hemorrhage in long-standing cases of disease of the appendages might be added as an occasional symptom (Jones). Ascites. Discharge, etc. Hematoma

4. The **diagnosis** can seldom be made from malignant disease or papilloma of the ovary with secondary involvement of the tube. The uterine discharge and the general debility or cachexia point to malignant disease, while the negative character of exploratory uterine curettage excludes malignant disease of the uterus. Difficulty. Discharge. Cachexia. Negative curettage.

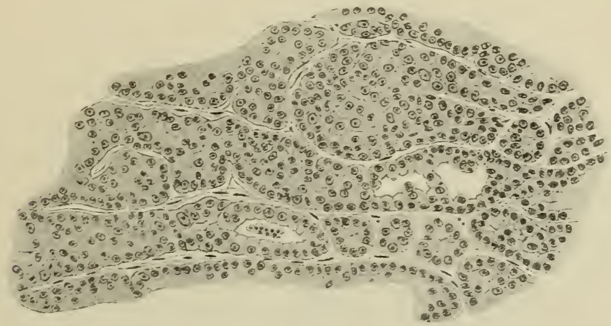


FIG. 292.—MICROSCOPIC SECTION FROM FIG. 291. Zeiss, Ocul. 2, Obj. C. (*Eckardt.*)

If there is cyst formation, aspiration per vaginam will stop the uterine discharge for a week or two, when it will gradually commence again (one personal observation). The aspirated fluid is usually thin and tinged with blood.

5. The **treatment** consists in removal of the appendages, and, if the uterus is affected, also of the uterus. Removal.

CHAPTER VI.

CARCINOMA OF THE OVARY.

Rare. Age. Bilateral.

1. Excluding ovarian cystomata that have undergone carcinomatous transformation, carcinoma of the ovary is a rare affection, although it is met with more frequently than other solid tumors of the ovary. It may affect the young as well as the old, and is apt to occur on both sides.

Four forms.

2. It is met with in four forms: (1) a diffuse infiltration of the ovary originating in the epithelium of the follicles of Pflueger's ducts; (2) an adenocarcinoma (von Mengershausen); (3) a superficial development from the germ epithelium; and (4) a carcinomatous development in a papillary ovarian tumor.

Rounded. Size. Consistency. Pedicle.

In the first form the ovary retains a rounded shape for a long time, except that the surface becomes nodular. It seldom attains the size of an adult's head, and varies from a scirrhous to a medullary or alveolar character. The pedicle and broad ligament become infiltrated sooner or later.

In the second form the tumor grows after the manner of an adenoma, in that the newly formed tissue does not consist entirely of atypical nests of cells, but of structures resembling ovisacs.

Papillary structure. Peritoneum infected.

In the third form a dendritic growth appears on the surface of the ovary that, in the later stages, can not be distinguished from papilloma of the ovary, and which rapidly infects the surrounding peritoneal surfaces.

Frequency. Papillary cystoma. Size.

About one-half of the papillary tumors of the ovary are known to be carcinomatous (Fig. 293). The structure is that of papilloma with atypical development of epithelium. They seldom grow larger than a man's head, for the papillæ are apt to develop upon the surface, or penetrate the cyst wall, infect the peritoneum and contiguous organs, and in this way produce fatal results before the growth has attained a large size.

The irritation exerted upon the peritoneum is apt to cause an abundant ascitic effusion, which is often tinged with blood. Ascites.

6. The *symptoms* do not, in the beginning, differ from those of ordinary ovarian diseases causing enlargement. Later the Not characteristic at first.

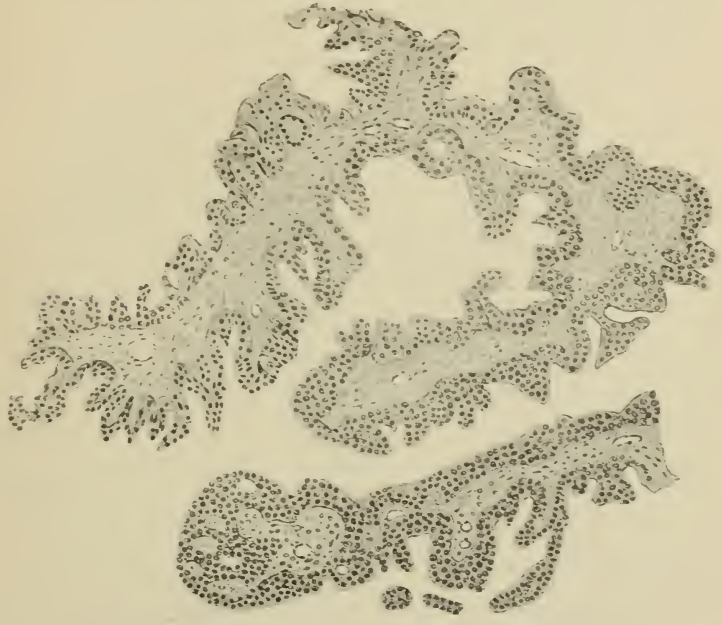


FIG. 293.—MALIGNANT PAPILLARY OVARIAN CYSTOMA. (*Pfannenstiel.*)
Section of papillæ. The epithelium is polymorphous, in multiple layers, and in active proliferation.

ascites, rapid growth, symptoms of mild localized peritonitis, impaired nutrition, and cachexia are characteristic. Tympanites and diarrhea not infrequently result from infection of the mesenteric glands. Ascites, rapid growth, peritonitis, cachexia. Tympanites and diarrhea.

7. The *diagnosis* is based upon the blood-tinged ascites about the tumor, infiltration of the broad ligament, nodules Ascites, infiltration, nodules.

Pain, cachexia. Bilateral.

about the recto-uterine culdesac, local pains, cachexia, and by its frequent bilateral manifestation.

8. The *prognosis* is exceedingly unfavorable. Nearly all of the solid tumors extirpated are followed by a return, and over half of the glandular and papillary (Kratzenstein).

Removal.

9. The *treatment* in the early stages consists in removing both ovaries. When the broad ligament and culdesac are affected, tapping to relieve the pressure, and general symptomatic treatment, are all that is indicated.

Tapping. Symptomatic.

PART TEN.

SARCOMA.

CHAPTER I.

SARCOMA OF THE VULVA AND VAGINA.

1. **Sarcoma of the vulva** occurs in the form of round-cell or spindle-cell sarcoma, melanosarcoma or myxosarcoma. It may begin in the clitoris or in the labial surfaces, and grow rapidly to be a large projecting tumor, or it may commence deeper in the connective tissue. The ulcerative, necrotic, and septic changes take place the same as in carcinoma, and are associated with the same symptoms. It is apt to attack young women.

Varieties.
Commencement.
Like carcinoma.
Age.

The diagnosis is generally made by microscopic examinations of portions removed.

The treatment is the same as for cancer.

3. **Sarcoma of the vagina** is a rare affection. Two forms have been described, one of which occurs in adults, the other in young children.

Rarity.
Two forms.

That which affects *adults* commences as a circumscribed tumor in the vaginal wall, occasionally as a polypus, and may resemble a fibromyoma. As it enlarges it projects well above the surface, and ulcerates, and resembles a papillary growth. In some cases ulceration does not occur until the growth is large enough to produce pressure symptoms. Rarely it takes the form of a diffuse infiltration surrounding the vagina.

In adults, circumscribed or polypoid.
Ulceration. Papillary shape.
Pressure.
Diffuse infiltration.

Microscopically it presents the usual characteristics of sar-

Variations.

coma elsewhere. A melanotic, telangiectatic, and, not uncommonly, a myxomatous form, have been observed.

Polypoid. Anterior wall. Diffuse. Extension. Disintegration.

4. The sarcoma of *children* usually begins as a grape-like polypoid mass, more often on the anterior vaginal wall, resembling somewhat sarcoma of the cervix (Veit). It spreads rapidly over the vaginal wall, passes comparatively early to the bladder and cervix, and finally infiltrates the pelvic organs and connective tissue throughout. It shows a marked tendency to break down and undergo septic changes.

Commencement. Variations in structure.

It begins in the connective tissue near the surface, and is variable in character. It sometimes resembles in structure a fibrosarcoma; in others, a myxosarcoma; in others, a rhabdomyoma. A cavernous nature has been observed.

Pain. Protrusion. Pressure symptoms. Protrusion. Discharges.

The first of the *signs* and *symptoms* in children is usually pain in the vulva and an appearance of a small polypoid growth at the vaginal entrance; in adults, the pressure symptoms, or, occasionally, the appearance of the tumor at the vulva, may be first. As the disease progresses, bloody, and irritating, and offensive discharges become the prominent ones.

The *diagnosis* should be made by the microscope.

The *prognosis* is bad, as but few permanent cures have been effected.

Removal. Palliation. Partial or total extirpation of vagina. Perineal incision.

The *treatment* consists in an early radical removal. When the disease extends for any distance into the connective tissue, a palliative excision and cautery must suffice. When the deeper parts are not affected, an extirpation of that portion of the vagina affected and for some distance beyond, even to a total extirpation, is indicated. The disease is best attacked through a perineal incision from the connective-tissue side.

CHAPTER II.

SARCOMA OF THE UTERUS.

1. **Sarcoma of the uterus** is much more rarely observed than carcinoma. It occurs at any age, but most frequently between thirty and forty years.

Rarity. Age.

Three distinct varieties have been described: papillary sarcoma of the cervix, sarcoma of the endometrium, and sarcoma of the uterine walls. Endothelioma of the cervix is described elsewhere (chap. IV).

Varieties.

2. **Papillary Sarcoma of the Cervix.** Papillary sarcoma of the cervixusually contains round-cell, spindle-cell, and normal connective tissue, and has a characteristic edematous papillary structure. The mass is soft in consistence, and grows to a large size, often filling the vagina and exerting pressure upon the urethra and rectum. It takes the form of irregular polypoid masses, sometimes not unlike a bunch of grapes (sarcoma botryoides). The disease originates in the mucous membrane of the vaginal portion or cervical cavity, and spreads along the mucous membrane into the uterus and to the vagina, and finally invades the pelvic connective tissue and peritoneum.

Microscopic character. Gross character. Consistence. Size. Pressure. Polypoid. Origin. Extension.

3. The *cause* is undoubtedly a specific form of irritation. The effect of this unknown irritant depends, first, upon its virulence, and, second, upon the susceptibility of the tissues attacked, producing, as the case may be, a relatively larger number of spindle or of round cells.

Specific form of irritation.

4. The early *symptoms* are hemorrhage and irritating discharges, which become purulent and increasingly offensive. Anemia rapidly supervenes. Retention of urine, constipation, and other symptoms of pressure upon neighboring parts may develop, accompanied either by protrusion of the end of the blackish-red mass, or even by expulsion of portions of it.

Hemorrhage. Discharges. Anemia. Pressure symptoms. Protrusion.

Later pains. Death.

Toward the end pelvic pain extending up into the peritoneal cavity, and sciatic pains, are noticeable. Death ensues from anemia and exhaustion, sometimes from peritonitis.

Microscopic examination. Later signs.

5. In the early stages a microscopic examination is necessary to *diagnose* sarcoma from cancer. Later the large size and soft edematous character, papillary conformation, blackish-red color, and evidences of pressure on the urethra are distinctive.

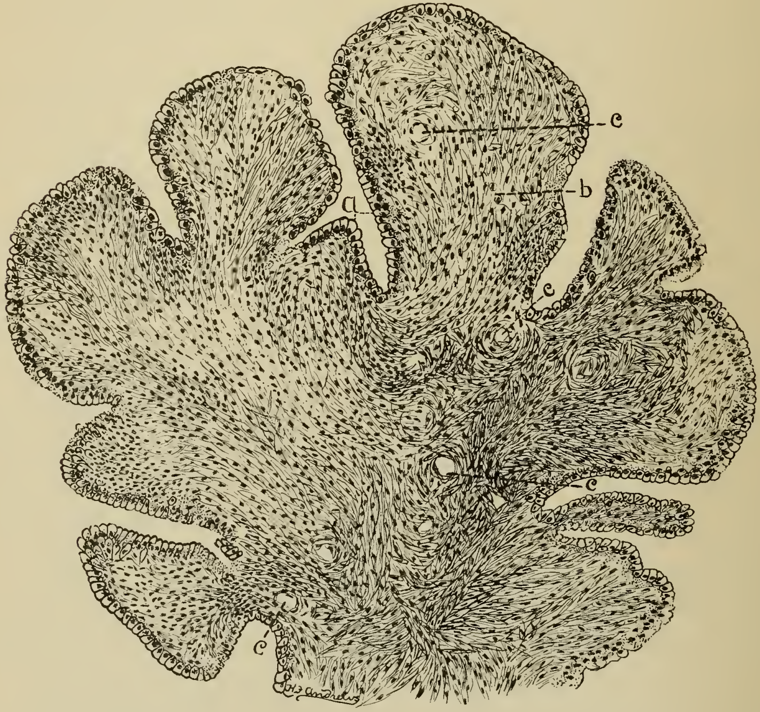


FIG. 294.—SARCOMA OF THE CERVIX. (*Prepared by Evans from Author's Case.*) × 110.
a. Epithelium. *b.* Spindle cells. *c, c, c, c.* Vessels.

The hydatidiform mole may resemble it somewhat, but it can be traced into the uterine cavity, whereas the malignant tumor is attached to the cervix. A benign polypus does not bleed freely nor disintegrate upon pressure made by the finger.

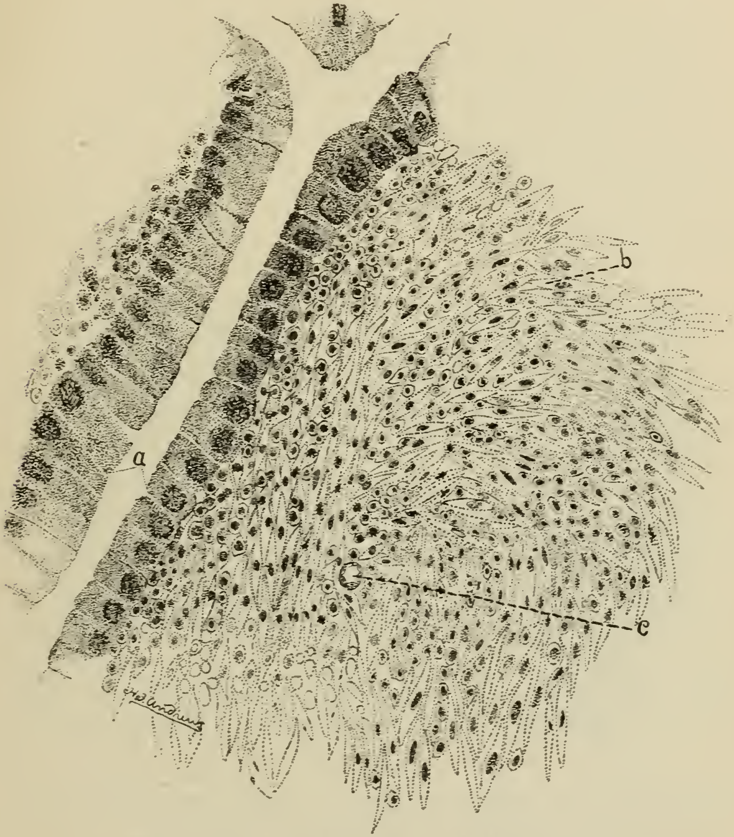


FIG. 295.—HIGHER POWER OF PRECEDING FIGURE. × 640.
a. Columnar epithelium. This was generally in a single layer. In places it was healthy, in others degenerated. From some places it was absent, in others it was piled up. *b.* Spindle cells cut generally lengthwise. Some are cut across through the nucleus, others above the nucleus. *c.* Capillary.

6. The *prognosis* is unfavorable unless the disease is subjected to treatment in the early stages. Unfavorable.

7. The *treatment* consists in vaginal hysterectomy (part IX, chap. III, par. 20). The tendency of the disease to spread along Vaginal hysterectomy.

the mucous membrane of the cervix would render an amputation of the cervix useless except in the very beginning.

When it is too late for radical measures, the diseased tissues may be curetted away, the cervix swabbed off with the solution of ferric chlorid, and the vagina douched out two or three times daily with antiseptic and astringent solutions. The application of the iron may be repeated every four or five days as long as softened tissue is found.

Curettage. Ferric chlorid. Douches. Repeated applications.

8. **Sarcoma of the Endometrium.** Sarcoma of the endometrium is, as a rule, of the round-cell variety, and is developed from the connective tissue of the mucous membrane. It is ordinarily a diffuse papillary growth, but is sometimes circumscribed. It originates above the internal os, but may, in exceptional cases, begin in the cervix.

Round-cell. Origin. Character. Commencement.

It grows in projecting ridges of light gray, soft, brain-like substance of great capillary vascularity, with knobby and flat projections (Fig. 297), or as a soft projecting sessile or polypoid mass. The tissue does not break down as readily as that of epithelioma, and is apt to fill the uterus, and may even project through the internal os. The uterine walls are hypertrophic, but as they are gradually invaded by the destructive process they may become a mere shell (filled with the brain-like mass) before the disease reaches the peritoneal surface and causes adhesions and infection of neighboring organs. Metastasis may not take place until the uterine walls have become extensively diseased. There is a class of cases in which the

Appearances. Fills uterus. Uterine walls. Adhesions. Metastasis. Ulcerating cases.

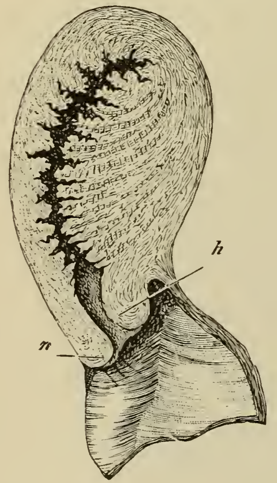


FIG. 296. — DIFFUSE SARCOMA OF THE ENDOMETRIUM. (*Winckel.*)
n. Anterior lip. *h.* Posterior lip.

mucous membrane breaks down rapidly without proliferation and vegetation, leaving an ulcerated surface (Terrillon). The elements of both sarcoma and cancer have been found in the same growth. The tumor is composed of round cells, with but a small amount of intercellular substance. (Fig. 297.)

Mixture.

9. The *symptoms* are a watery discharge, menorrhagia, and later profuse hemorrhage. At first the discharge has a disagreeable odor similar to that connected with childbirth, and is pinkish at times, but it soon becomes sanious and fetid. Uterine colicky pains, dilation of the cervix, and protrusion of the sarcomatous tissue are not uncommon. Anemia, septicemia, pelvic pains, and about all of the symptoms of cancer of the cervix present themselves in the later stages.

Discharge.

Hemorrhage.

Odor and color.

Pains and protrusion.

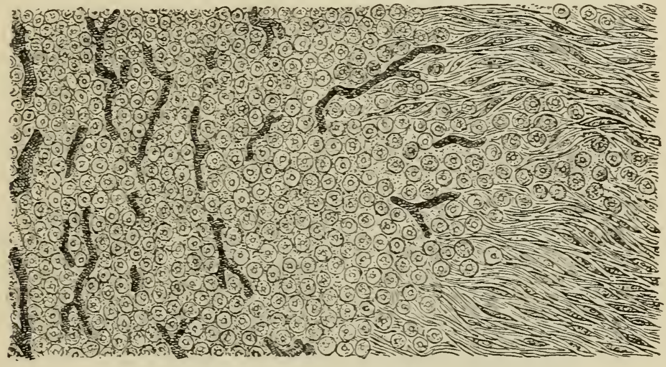


Fig. 297.—Microscopic Section of Diffuse Sarcoma of the Endometrium. (*Wyder.*) To the right are seen uterine muscular fibers which are being interpenetrated and destroyed by the round sarcoma cells. To the left are numerous enlarged blood-vessels. Mucous membrane is not found anywhere in the tumor.

Symptoms of cancer.

10. The *physical signs* are similar to those of carcinoma of the endometrium (part IX, chap. IV, par. 5), and the differential diagnosis must usually depend upon the microscopical examination. The patency of the cervix, and the whitish, brain-like appearance of the tissue brought out by the finger or the curette, together with the preponderance of profuse hemorrhages over

Carcinoma.

Microscopic.

Characteristic signs.

Age. other symptoms, indicate the nature of the affection. In very young women sarcoma rather than carcinoma would be suspected.

Prognosis. 11. When seen in the early stages the disease may often be cured, as it is apt to remain for a long time confined to the uterus.

Carcinoma. 12. The *treatment* is the same as for carcinoma of the uterus. When the uterus for any reason can not be removed, dilation of the cervix, curettage, and the free application of the solution of chlorid of iron or a 50 per cent. solution of chlorid of zinc to the endometrium may be of palliative value.

Palliative.

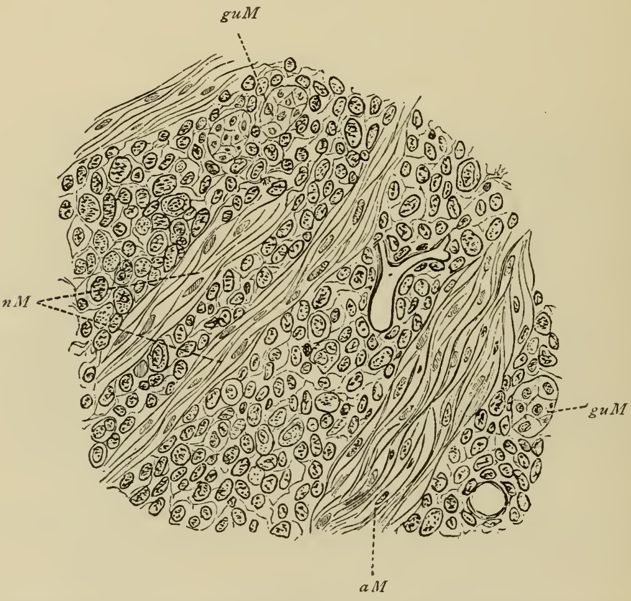


Fig. 298.—Microscopic Section of Sarcoma of the Uterine Wall. (*Schroeder-Hofmeier.*)

aM. Cells in longitudinal section. *guM.* Atrophic bundles of muscular fibers in transverse section. *nM.* Normal muscular tissue.

Resembles fibro-myoma. 13. **Sarcoma of the Uterine Walls.** Myosarcoma of the uterus resembles, in many characteristics, myoma. In a

Origin. Location. Appearance. Cells. Polypoid. Fibro-sarcoma. Relation to surroundings. Size. Cysto-sarcoma. Cervix.

primary form it arises from the connective tissue of the walls of the blood-vessels. It is more often submucous, but may be intramural or subserous. It occurs, as a rule, in nodules of a white, smooth, glistening tissue, composed of round and spindle cells, but sometimes assumes the form of a diffuse infiltration of spindle cells. The submucous tumors frequently become polypoid, and usually show the structure of myomatous polypi together with the cells of sarcoma. In some instances myosarcomas are myomas that have undergone transformation. They are intimately connected with their surroundings instead of having loose capsules like the fibroids, and give rise earlier than carcinoma to metastatic growths, sometimes in distant parts of the body. They show but little tendency to disintegrate, and may attain to a considerable size. Occasionally cystic degeneration takes place, producing cystosarcoma. Myosarcoma originates in the cervix in rare instances only.

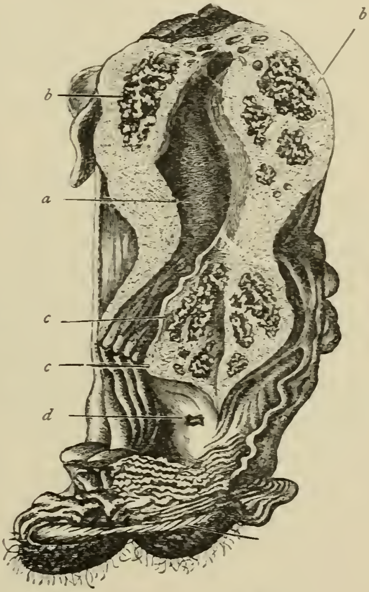


Fig. 299.—Sarcoma of the Walls of the Uterus. (*Winckel.*)

a. Uterine cavity; deposits of sarcoma are seen in the uterine walls at *b*, *b*, in the cervix at *c*, *c*, and in the vagina at *d*.

Same as in other forms.

14. The *cause* is the same as the other forms of sarcoma (par. 2), but the irritation is milder in character and slower in action.

Like fibroma at first. Hemorrhage. Discharge. Odor. Pain.

15. The *symptoms* in the early stages are the same as those of fibromyoma. Menorrhagia, later metrorrhagia, and a watery, pinkish discharge, which, as the disease advances, becomes purulent and offensive, are generally observed. Pain is a late

symptom, and in the later stages is peritoneal in character. Like carcinoma later. As ulceration progresses the symptoms resemble those of cancer of the uterus, except that the sarcomatous uterus is often larger. Duration. The disease may run its fatal course in a few months, or it may last several years.

From fibromyoma. 16. Rapid growth and foul-smelling discharges distinguish it from fibromyoma. From carcinoma. From carcinoma, on the other hand, it is known by the comparatively slow growth, and frequently by its larger size. Sloughing fibroid. A sloughing myoma may sometimes be distinguished by its previous history, with the sudden supervention of the septic symptoms. Microscopic. A microscopic examination may be necessary.

17. The *prognosis* is the same as that of other malignant diseases, viz.: Fatal. fatal, unless it is removed early. Slow. The progress is slower than that of sarcoma of the endometrium, but metastasis, Metastasis. by way of the circulation to neighboring and distant organs, is liable to occur in advance of serious symptoms.

Total hysterectomy. 18. The entire uterus should be removed by vaginal hysterectomy, if such be practicable; otherwise by abdominal section (part IX, chap. III, par. 23 to 26).

CHAPTER III.

SARCOMA OF THE FALLOPIAN TUBES AND OVARIES.

Rarity. 1. Primary **sarcoma of the Fallopian tubes** has been observed but four or five times. Excepting their microscopic character, Carcinoma. these cases resembled carcinoma of the tube in all respects, and required the same treatment.

Frequency. 2. **Sarcoma of the ovary** has been found to exist in about one per cent. of ovarian tumors. It is usually of the spindle-cell Cells. variety, occasionally of the round-cell. The former is of

Density. Appearance. Vascularity. Size.

about the density of an edematous uterine fibroid, the latter much softer. It is globular or ovoid, and smooth on the surface, which may, however, be irregular on account of the projection of cysts. The growth is vascular, and is sometimes cystic and sometimes cavernous, and may attain the size of a five- or six-months pregnant uterus.

Variations. Changes.

It occurs as a pure sarcoma, a fibrosarcoma, a myxosarcoma, a cystosarcoma, an adenosarcoma, or a carcinosarcoma, and sometimes undergoes fatty or calcareous degeneration. Small extravasations of blood in its substance, suppuration, or even gangrene, may follow a twisting of the pedicle or injury during labor.

Age. Both affected.

They occur by preference in young people, and are sometimes found at birth. Both ovaries are apt to be affected.

The *prognosis* is ordinarily unfavorable, yet the tumor does not always recur when removed early. Fibrosarcoma shows but little tendency to recur (Kratzenstein).

The *diagnosis* is the same as given for ovarian fibroma (part XI, chap. III, par. 3).

The *treatment* consists in an early removal by abdominal section.

CHAPTER IV.

ENDOTHELIOMA.

Undetermined character. Sarcoma.

1. Whether endothelioma (Golgi) should be considered as a variety of carcinoma, or of sarcoma, or as a separate pathological condition, can not, on account of the contradictory opinions of eminent authorities, be definitely determined. Until these differences shall have been settled, Ziegler's classification of it among those sarcomata which have a particular arrangement of their constituents, resembling epithelial growths or carcinoma, will be adhered to.

Origin. Those met with in the female genital organs arise as a proliferation of the endothelium of the lymphatics or capillary Frequency. blood-vessels. So far, endothelioma of the vagina (one case), of the cervix (two cases), of the uterus (one case), and of the ovaries (11 cases), have been recognized and described. Careful microscopical examinations will undoubtedly bring more cases to light.

Not characteristic. The symptoms and course correspond so closely to those of sarcoma and carcinoma that their recognition is of greater scientific than clinical value. The fact, however, that death Bad prognosis. has soon followed in a large proportion of those operated upon has a practical bearing upon the prognosis.

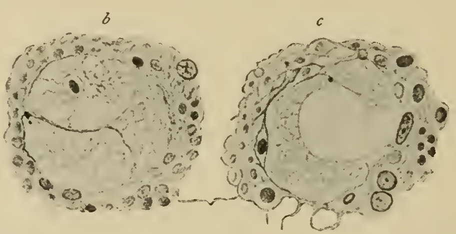


FIG. 300.—LYMPHANGIO-ENDOTHELIOMA CAVERNOSUM HEMORRHAGICUM OF THE VAGINA. (*Klien.*)

b and *c*. Small spaces lined by large endothelial cells. The lumen of *c* is empty.

2. **Endothelioma of the vagina** has been described in one Case. case only (Klien), in a fifty-six-year-old multipara. The two Character of the tumors. tumors were tense, elastic, polypoid masses, the size of a small apple and a plum respectively, which bled upon being handled, and whose substance could easily be mashed.

Cavernous angioma. Their structure resembled that of cavernous angioma, with large spaces filled with blood and smaller ones entirely free Lining. from blood-corpuscles. (Fig. 300.) They were lined partly with the connective tissue of the vaginal walls and partly with Cells of lymphatics. endothelium. The endothelial cells, which were demonstrated to arise from the lymphatic vessels, were sometimes in single, sometimes in multiple, layers, and varied from a normal appearance to that of enormous epithelioid cells (lymphangio-endothelioma cavernosum hemorrhagicum). Epithelioid.

The *symptoms* were irregular, at times profuse, hemorrhages from the vagina, and pain in the back and abdomen. Hemorrhage. Pain.

The *treatment* was removal and thermocautery of the base of the pedicle.

3. **Endothelioma of the cervix** has been described by Amann and Braetz. Macroscopically, the growth resembles carcinoma of the cervix, and may commence as a primary nodule in the cervical wall. Macroscopic appearances. Microscopically, the epithelium and glandular structure of the cervix shows no signs of malignant disease. Micro-scopic. Below the glands are strings of one or more layers of round and oval endothelial cells, with large bladder-like nuclei that occupy a large part of the cell cavity. Glands. Strings of cells. Within some of the larger strings or cylinders of cells can be seen spaces or lumina about which large epithelioid cells accumulate, and into which they project irregularly, sometimes almost, or completely, filling them. Lumina. Within the spaces or

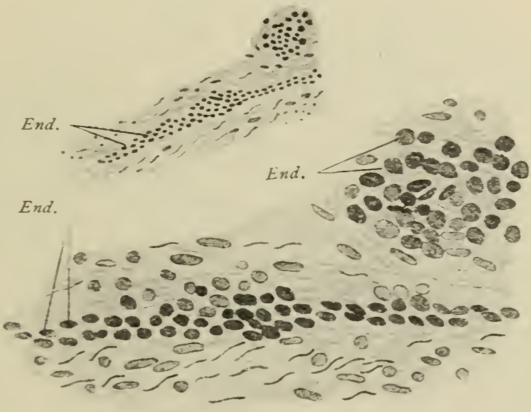


FIG. 301.—LYMPHANGIO-ENDOTHELIOMA OF VAGINAL PORTION OF CERVIX. (*Braetz.*) A lymph-space distended in places by endothelial cells. *End.* Endothelial cells. Above and to the left is a view of the same parts by a low power.

Intercellular substance. Leukocytes. Connective tissue.

lumina and about the cells can sometimes be seen a fine striated fibrinous substance. Among the cells are usually found numerous leukocytes. The connective tissue is delicate and scant, and in places near the center of the tumor is wanting, but near the edge it is more abundant and traversed by a few muscular fibers. This condition is called carcinoma of the lymph-spaces by Ruge.

Like carcinoma. Cases. Age. Lesion of cervix.

4. The *symptoms*, *signs*, *prognosis*, and *treatment* are those of carcinoma of the same parts. Of the two cases recorded, one was a virgin eighteen years old, the other a nullipara thirty-one years old, indicating that the disease occurs at a younger age than carcinoma, and requires no previous lesion of the cervix for its development, as is supposed to be the case in carcinoma.

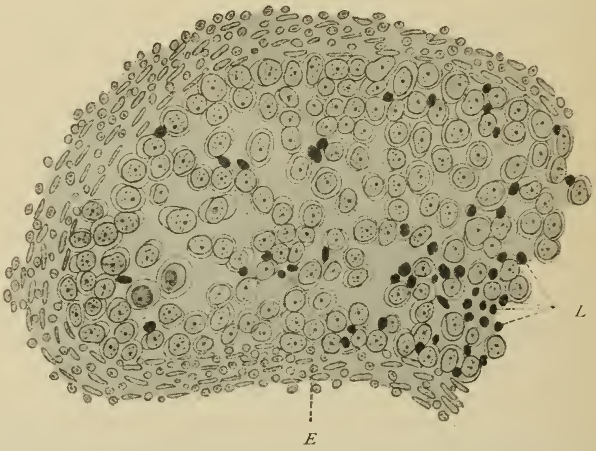


FIG. 302.—LYMPHANGIO-ENDOTHELIOMA OF THE VAGINAL PORTION OF THE CERVIX. (*Braetz.*) Transverse section of tubular collection of cells (high power). *E.* Epithelioid cells. *L.* Leukocytes.

Case.

5. A case of **endothelioma of the uterine mucous membrane,** on the lower portion of a polypoid uterine fibroid tumor that had undergone sarcomatous transformation, was observed

by Pick. The microscopic appearances differed but little from those of endothelioma of the cervix. Microscopic appearance.

The *symptoms* were recurrent hemorrhage four years after the menopause in a fifty-two-year-old multipara, and a rapid recurrence after removal. Hemorrhage. Recurrence.

6. **Endothelioma of the ovary** occurs primarily as a solid tumor, and, secondarily, as a growth upon the walls of an ovarian cystoma.

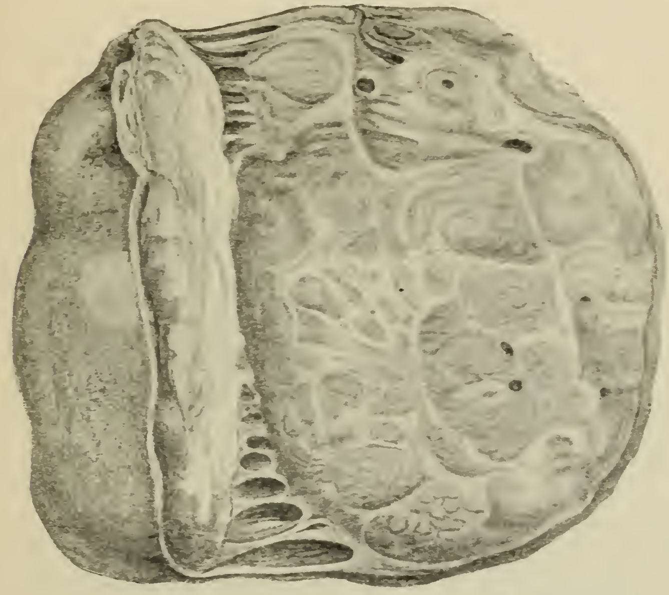


FIG. 303.—ENDOTHELIOMA OF OVARY. ⅔ SIZE. (*M. Voigt.*)

The *solid* tumors are usually round or ovoid, and may be slightly lobulated. They are somewhat soft in consistence and surrounded by a thin capsule of firm connective tissue. Upon section the surface is grayish-white, and may show spaces of varying size filled with a serous fluid, or it may be very vascular and show small blood spaces. Like other malignant ovarian tumors, they are accompanied by ascites, and after attaining a large size contract adhesions. Physical character. Section. Ascites. Adhesions.

Minute structure.

Microscopically, they are composed of tubes and masses of enlarged endothelial or epithelioid cells situated in connective tissue. Within the tubes are spaces in which epithelioid cells are found in greater or less abundance. If the disease arises in the blood-vessels, blood-corpuscles are also found in them. In other respects the construction corresponds with that already given for endothelioma of the cervix.

Blood-vessels.

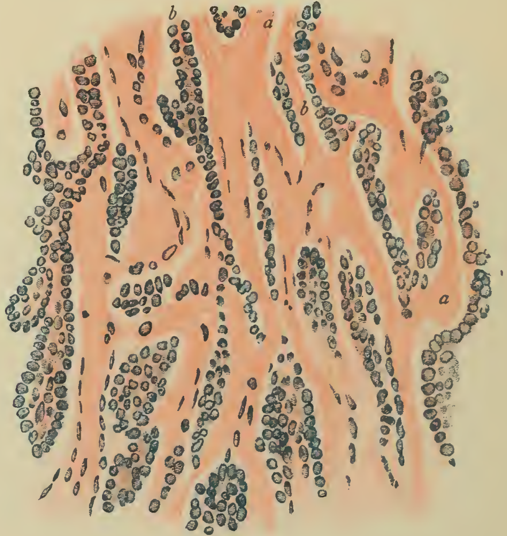


FIG. 304.—MICROSCOPIC SECTION FROM FIG. 303. (*M. Voigt.*)
a. Hyaline tissue. *b*. Epithelioid cells.

In *secondary* endothelioma, masses of irregular shape grow in the walls of ovarian cystoma, which present similar microscopic and macroscopic appearances.

7. The disease runs a malignant course and can not be differentiated clinically from other malignant ovarian cystomas. Hence, the symptoms, diagnosis, prognosis, and treatment are the same.

PART ELEVEN.

MYOMA, FIBROMA, FIBROMYOMA.

CHAPTER I.

MYOMA OR FIBROMYOMA OF THE VULVA AND VAGINA.

1. **Myoma of the Vulva.** Myomata are occasionally developed from the subcutaneous connective tissue of the labia Labia majora.

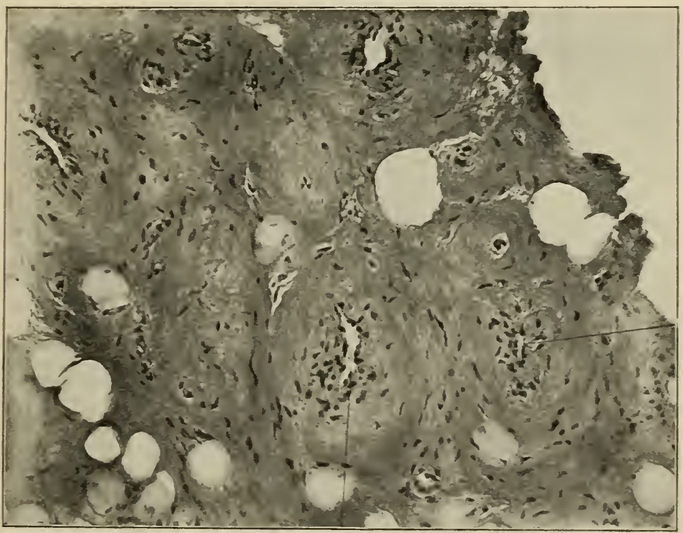


FIG. 305.—MYXOFIBROMA OF THE VAGINA. (*Evans' preparation of J. B. Murphy's case.*)
b. Blood-vessels surrounded by fibrous tisuse.

majora, where they may grow to considerable size, become Size, etc. pendulous, and cause ulceration of the skin over them. They

Other places. Degeneration.

also originate in the perineum, the labia minora, and the region about the meatus urinarius. Some tumors undergo cystic degeneration, and thus become converted into the cystic variety (cystomyoma).

Consistence. Elasticity. Skin.

They are quite firm in consistence, but often give a sensation of fluctuation or elasticity to the examining finger that suggests a cyst. When not developed in the cutaneous connective tissue, the skin can be moved over them.

Removal.

They should be removed as soon as discovered, and the resulting wound be sewed up. The hemorrhage is, as a rule, but slight.

Myoma. Location. Ulceration, etc. Semi-elastic. Aspiration. Rectal examination. Catheter.

2. **Myomata of the vaginal walls** have often been found, *fibromata* but seldom. They may remain in the vaginal walls, or become pendulous and be extruded at the vulva. In the latter case the capsule becomes ulcerated and sometimes gangrenous. They usually give a semi-elastic sensation to the touch, but if aspirated yield only a few drops of blood. The finger should be introduced into the rectum and a hard catheter or sound into the bladder, in order to exclude the possibility of a rectal or vesical origin.

Incision. Enucleation. Sutures. Pendulous.

The *treatment* consists of an incision in the vaginal wall over the most prominent portion, followed by enucleation of the tumor and complete closure of the bed with buried catgut or deep silkworm-gut sutures. When pendulous, they should be amputated, and the artery in the pedicle twisted or ligatured.

CHAPTER II.

MYOMA OR FIBROMYOMA OF THE UTERUS.

(UTERINE FIBROIDS.)

(*Abdominal Hysterectomy.*)

Nature.

1. Myomata, fibromyomata, or fibroid tumors of the uterus, consist of a proliferation of the muscular and connective tissues

of the uterus. According to their location they are called polypoid, submucous, intramural, subserous, and intraligamentous. The *polypoid* tumors begin just under the mucous membrane, and project more and more, as they grow, until they become pendulous. The *submucous* develop near the mucous membrane, and are apt to project into the uterine cavity without becoming pendulous (sessile), and without any layer, or only an attenuated layer, of uterine muscular tissue on the mucous side. The *intramural* develop within the uterine walls at a distance from the surface, and are surrounded on all sides by uterine muscular tissue. The *subserous* develop upon or near the external surface under the peritoneum, and either project upon the surface or become pedunculated. The *intraliga-*

Varieties.

Pendulous.

Project.

Covered by mucous membrane.

Surrounded by muscular tissue.

Project.

Pedunculated.

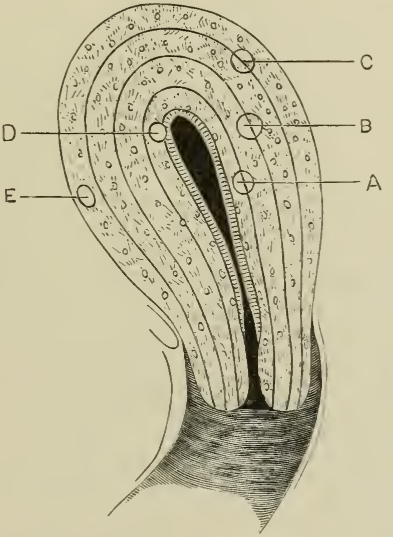


Fig. 306.—Location of Uterine Myoma. (*W. H. Byford.*)

D. Submucous myoma that will become polypoid. A. Submucous myoma that as it develops will project into the uterine cavity. B. Intramural myoma that will enlarge the uterine walls in all directions. C. Intramural myoma that will project on the surface of the uterus. E. Subserous myoma likely to become pediculated.

In ligaments.

mentous or subperitoneal develop on or near the surface not covered by peritoneum, and project from the uterus under the folds of the broad or sacro-uterine ligaments.

From 90 to 95 per cent. develop in the uterine body. According to Klob, 40 per cent. of all women who die after the fiftieth year have uterine fibroids. The estimate is probably too high. They are never found before puberty.

Structure.

2. **Pathological Anatomy.** These tumors are composed of a varying proportion of connective tissue and hypertrophied muscular fibers irregularly interwoven, and are usually separated from the uterine wall by a capsule of loose connective tissue. They have their origin in round cells situated about capillary blood-vessels, which become obliterated by the growth of the cells. In some cases the tumor is interstitial and continuous with the uterine walls without being encapsulated. These are usually adenomyomata or cystadenomyomata (von Recklingshausen), and contain tubular glands (Fig. 313).

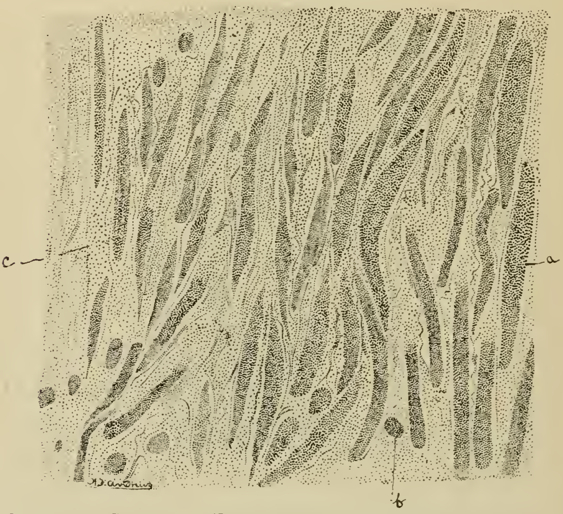


FIG. 307.—MICROSCOPIC SECTION OF UTERINE MYOMA. (*Prepared by Evans from Author's Case.*) × 480.
a. Muscular fibers. *b.* Cross-section of muscular fibers. *c.* Connective tissue.

Origin.

Interstitial.

Adenomyoma.

Submucous and polypoid tumors are apt to contain considerable glandular tissue.

Vascularity. Density. Cut surface. Construction.

They are seldom vascular in their substance, but are apt to be surrounded by vascular and hypertrophic uterine walls. Their density varies in different cases, from almost stony hardness to well-marked flaccidity. The cut surface, if connective tissue predominates, is yellowish-white, smooth, glistening, and hard, unless softened by edematous changes. If muscular tissue is in excess, the color is pinkish or light-red. That of adenomyoma is less smooth, and shows a coarse, dense network of glistening bands (Cullen). The tumor may consist of one mass, or of several distinct masses developed side by side and inclosed in a single capsule, or many tumors with individual capsules may be scattered throughout the uterine walls (multiple fibroids).

Scattered.

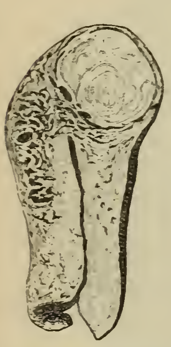
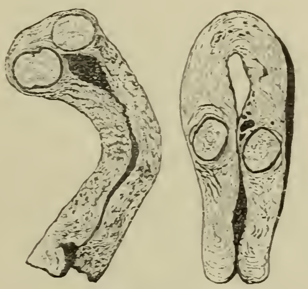


FIG. 308.—SUBSEROUS MYOMA, ½ SIZE. (*Winckel.*)



FIGS. 309 and 310.—INTRAMURAL MYOMATA, ½ SIZE. (*Winckel*)

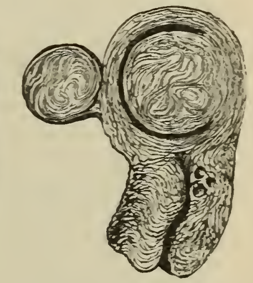


FIG. 311.—SUBSEROUS AND SUBMUCOUS MYOMATA, ½ SIZE. (*Winckel.*)

Cavernous. Edema. Cyst formation.

3. Among the variations from the ordinary may be mentioned the cavernous, which contain numerous small blood spaces from the size of a capillary to that of a pea. Other variations are: Edema, with corresponding softening of the tumor; cyst formation in their substance (cystomyoma), with one or more accumulations of alkaline serous fluid, or of gela-

Degeneration. tinous fluid of light or dark color; myxomatous degeneration (myxomyoma); fatty degeneration; calcareous degeneration; sarcomatous transformation (myosarcoma); and, rarely, cancerous transformation. Necrosis, etc. Necrotic and sloughing submucous and polypoid tumors, and abscess formation in the interstitial variety, are occasionally observed. Complete fatty or myxomatous degeneration may remove all traces of solid tissue, so that nothing but a sac of thick fluid is found imbedded in the uterine walls (part XII, chap. I, par. 6). Some cysts are formed by an accumulation of fluid in dilated lymphatic vessels.

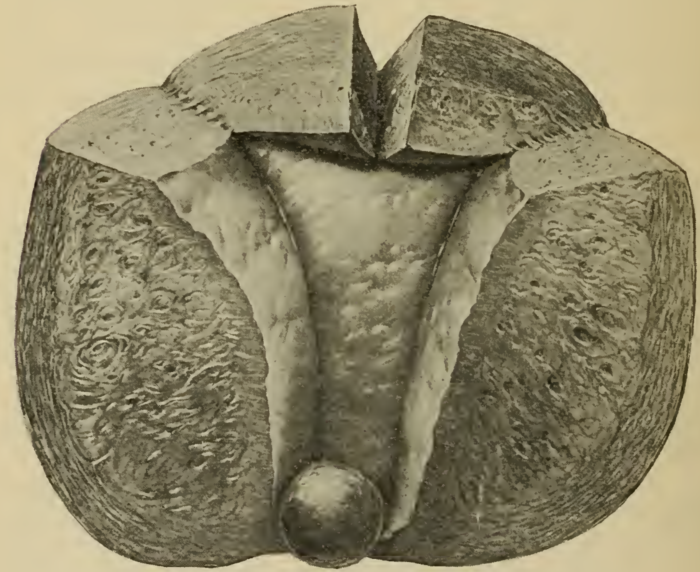


FIG. 312.—DIFFUSE ADENOMYOMA OF THE UTERUS. (*Cullen.*)
The tumor has no capsule, does not cause a projection of the mucous membrane, and looks coarse in structure on account of the presence of glandular tissue.

Sac of fluid.

Number. Sometimes but one tumor is present, and sometimes many are found on the same uterus. Occasional tumors, particularly Size. the cystomyomata, attain a large size, one having been removed postmortem that weighed 195 pounds.

Adhesions to the omentum, abdominal walls or abdominal viscera exist in nearly all cases of very large tumors, the result of pressure-peritonitis.

Adhesions.

Uterine hyperplasia and oophoritis are common complications.

4. **Etiology.** We are still in the dark as to the causes. From their clinical history and the concurrent pathological conditions of the endometrium and uterine adnexa, it would seem probable that such tumors are the result of long-continued irritation. That the lodgment of some microparasite in congested or inflamed tissue in the genital tract will be proven to be responsible for their development seems not unlikely.

Doubt.

Continued irritation.

Micro-parasite.

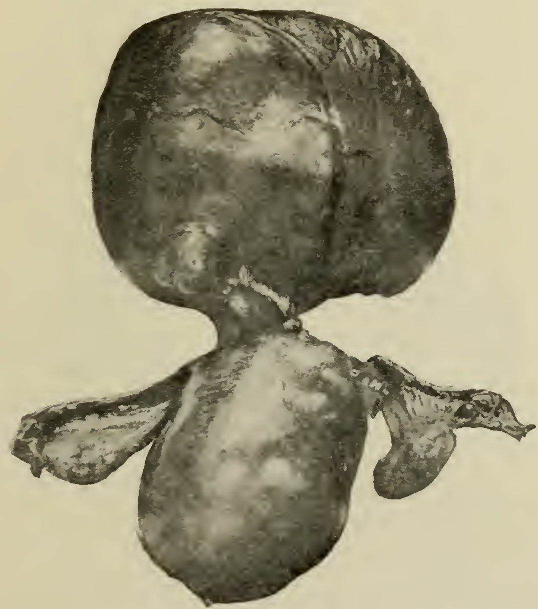


FIG. 313.—UTERUS AMPUTATED AT THE INTENAL OS UTERI, SHOWING INTRAMURAL MYOMAS OF THE CORPUS AND A LARGE PEDICULATED MYOMA GROWING UPWARD FROM THE FUNDUS. THE OVARIES AND TUBES ARE SEEN HANGING FROM THE UTERUS HORNS. (*Author's Case.*)

5. **Symptoms.** In the polypoid and submucous varieties

Hemorrhage.

menorrhagia and metrorrhagia are the most notable symptoms; Intramural. in the intramural variety menorrhagia is frequent; while in the

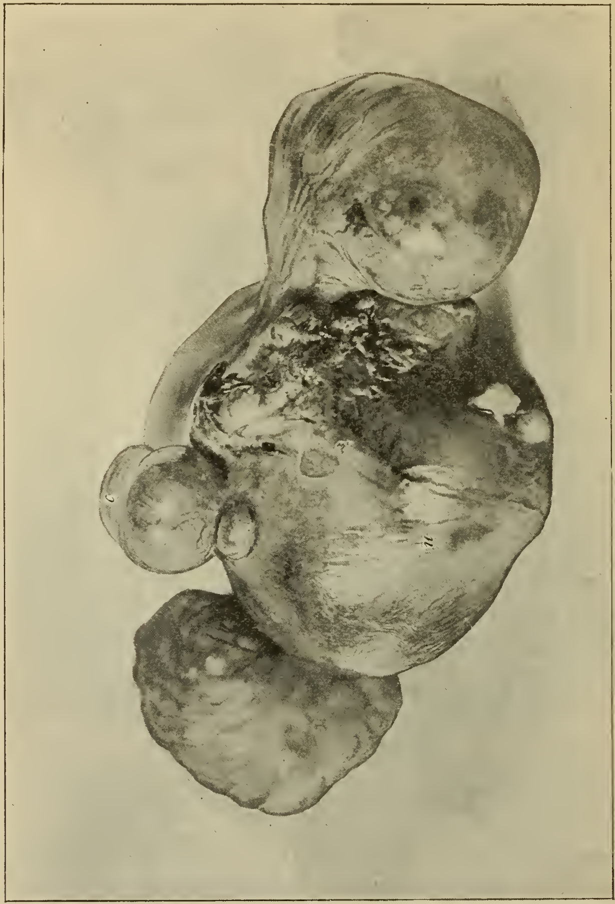


Fig. 314.—Intramural and Subserous Uterine Myomas. ½ Size. (*Jos. Bacon's case.*)
u. Body of uterus, enlarged by intramural myomas. *c.* Small nodule just above the plane of amputation at internal os.

Subserous. exclusively subserous these symptoms are often absent. The Menopause. menopause may be delayed until after the fiftieth year.

Discharges. Leukorrhea and intermittent watery discharges are common.

Inflammatory. Pain is also a frequent symptom. It may be that of endo-

Contractions. Pressure. Situation.

metritis or ovaritis, or it may consist of painful uterine contractions due to the presence of a polypoid tumor, or to stenosis and retention of secretions from pressure of a polypus or submucous growth at or near the internal os; or it may be due to pressure upon the surrounding pelvic tissues by a large interstitial or subserous tumor. The pain from pressure may be in the bladder or rectum, or in the sciatic or gluteal nerve.

Constipation. Ureter, kidney, etc.

Pressure upon the rectum may cause troublesome constipation and intestinal symptoms. Pressure on the ureter may cause dilation of the pelvis or the kidney, atrophy of the kidney, albuminuria, etc.

Anemia.

Anemia is often pronounced.

Conception. Abortion, etc.

Sterility is the rule, although conception sometimes takes place and goes on to full term. Delivery of a living child may take place if the tumor is situated above the cervix. Abortion and premature delivery are apt to follow conception.

Heart.

The so-called brown atrophy and fatty degeneration of the heart are apt to be caused by large tumors.

Imperfect development.

Imperfect development of the genitalia is sometimes present in cases of adenomyoma.

Causes of death.

Death may result from exhaustion, from uremia, from the heart changes, or from septicemia.

Benign. Grow slowly. Impaction. Menopause. Expulsion. Blood supply.

6. **Course.** Uterine myomata in the majority of cases run a benign course. They grow slowly, and seldom destroy the patient directly from their bulk, but when adherent or impacted in the pelvis may cause serious symptoms before attaining to a large size. They sometimes stop growing at or near the menopause, and often diminish in size after it. M. R. Petit, of Rennes, considers an abnormally developed menstrual influence as the cause of uterine fibroids. If polypoid, they may be expelled per vaginam. A small number of intramural or submucous tumors may attain a great size, but a large number starting almost simultaneously tend by pressure to cut off the blood supply to each other and thus prevent extensive growth.

Degenerations, etc., rare. Anemia, etc.

Cystic and malignant degenerations and serious pressure upon surrounding organs are somewhat rare. Anemia and general impairment of health are the rule in cases of long standing.

Submucous tumors may, on account of uterine contraction, become pediculated, and even undergo necrosis. When a pediculated tumor is partly expelled, the capsule is liable to become necrotic. In either case more or less septicemia results.

Differentiation. Hardness. Cervix. Menses. Dilated cervix.

7. **Diagnosis.** *Single intramural, submucous, and polypoid myomata of moderate size* produce a rounded or ovoid enlargement of the uterus that must be differentiated from pregnancy, retained menses (hematometra), flexions, malignant disease and subinvolution. The fibroid uterus is either harder or more elastic than the *pregnant uterus* of equal size, grows more slowly, does not present the positive signs of pregnancy, and the cervix, although sometimes slightly dilated, is not softened and deepened in color as during pregnancy. The menses are on time or ahead of time instead of being absent. A large polypoid tumor often dilates the cervix slightly, and can be reached by the finger.

Uterine walls. External os. Menses. Cause of the stenosis.

When the *uterine discharges are retained*, the uterine walls are tense and elastic, but not as hard as the fibroid uterus; and either the internal or external os is impermeable to the sound. The menses have never appeared (atresia), or else there will be signs or symptoms of the disease or condition that has caused the stenosis (pyometra, hydrometra).

Bimanual examination. Sound.

Flexions of the uterus may, as a rule, be differentiated by means of the bimanual examination, aided by the use of the sound. (See part VI, chap. IV, par. 6. Fig. 166.)

Offensive discharges. Gradual metrorrhagia. Curette.

When the corpus is affected by *malignant disease* (excepting the early stages of myosarcoma), the offensive discharges are characteristic, and the flowing usually commences gradually as an occasional slight metrorrhagia, instead of as a simple menorrhagia. The sound or curette will bring out some of

Menopause.

the malignant tissue. It occurs most frequently at or after the menopause, while myoma almost always originates before the time.

Cervical enlargement. Body flatter.

In *subinvolution* there is generally some cervical as well as corporeal enlargement. The corpus is flatter, not being increased as much in thickness as when the fibroids are present.

Irregular. Sound.

8. *Intramural multiple* myomas enlarge the uterus more or less irregularly. The sound usually enters farther than normal, and instead of passing into the center of the mass goes in front, behind, or to one side, as determined by a simultaneous rectal or abdominal palpation. The uterine cavity is apt to be irregular in shape, making the passage of the sound difficult or impossible. The myoma is usually perceptibly harder than ordinary uterine tissue. When the tumor or tumors are near the outer surfaces of the uterus, the hard projections are still more apparent, and can be reached better in

Cavity. Harder. Projections.

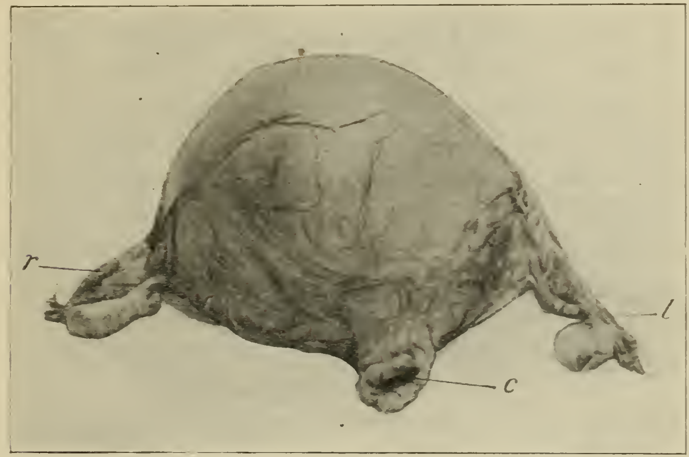


FIG. 315.—SUBMUCOUS MYOMA THAT SIMULATED A SIX-MONTHS' PREGNANCY IN A NULLIPARA. CERVIX PATULOUS FROM COEXISTING ENDOMETRITIS. (*Author's Case.*)
r. Right ovary and tube. *l*. Left ovary and tube. *c*. Patulous os.

difficult cases by having an assistant draw down the uterus by vulsella hooked into the cervix. A tumor projecting from the posterior wall of the cervix pushes it toward the pubes and sometimes over it. If the uterus has been involved in an exudate, it may be difficult to determine whether a given projection is a myoma, the *adherent appendages*, or a *small adherent ovarian tumor*. When it is a fibroid, the uterus is more movable and less tender, and the walls of the mass and the uterus do not ordinarily form as acute an angle as in the two latter conditions. The history of the case, and the discovery of the induration at a distance from the uterus and the congested appearance of the cervix aid in the diagnosis when the condition is of inflammatory origin. The adherent ovarian tumor presents the symptoms of inflammation, with more enlargement than in salpingitis, as well as a progressive development of the symptoms.

Vulsella. Displaced cervix. Exudate. Movable, less tender. Angle. History. Induration, etc. Adherent ovarian tumor.

A *pediculated tumor* is apt to be mistaken for an ovarian tumor unless the pedicle can be palpated. The presence of other uterine myomata argues in favor of its uterine origin. (See "Diagnosis of Ovarian Tumors," part XII, chap. II, par. 11.)

Pedicle. Other fibroids.

9. *Retro-uterine hematocele and hematoma* of the broad ligament may sometimes be differentiated by mapping out the normal-sized uterus in front or to one side of the mass by means of bimanual palpation and the uterine sound. It is often pushed up behind the pubes, where it can be easily grasped bimanually and moved independently of the mass. If it were a myoma, the uterus could not be moved without moving the tumor with it. While myomas render the menses more abundant, hematocele and hematoma merely prolong them or cause slight hemorrhages between them.

Mapping out uterus. Up behind uterus. Moving with tumor. Menses, etc.

10. When the *tumor is large* it usually displaces the cervix. An intra-uterine polypus or a tumor in the anterior, or high up in the posterior, wall causes the cervix to sink backward

Cervix displaced. Backward.

toward the coccyx, as in pregnancy, but as the growth becomes too large for the pelvis it draws the cervix upward. When, however, a large tumor is developed in the fundus, the cervix generally retains its low position in the pelvis. A large uterine tumor, unless it projects laterally, may be felt directly over the pubes, leaving both iliac regions free, while an ovarian tumor, although it may be felt over the pubes, also fills one of the iliac regions. An ovarian tumor in the broad ligament does not cause as much enlargement of the uterus as a myoma, and usually joins it at a more acute angle. Parovarian and broad ligament cysts are softer than fibroids.

Upward.
Low position.
Felt over pubis.
Ovarian tumor.
In broad ligament.
Parovarian, etc.

11. A *cervical fibroid* is easily recognized by the crescent shape of the external os and the flattening of the opposite lip. From cancer of the cervix it is known by the normal or merely eroded condition of the overlying mucous membrane, a certain degree of elasticity, and by its tenacity of structure as demonstrated by hooking a tenaculum into its substance. (See part IX, chap. III, par. 16.)

Os and lip.
Mucous membrane.
Elasticity.
Tenacity.

12. **Prognosis.** Myomata, although of slow growth, would, if not interfered with, result fatally in not a few instances, particularly those which commence in early life. The cystomyomata, and occasionally other varieties, may become large enough to put life in danger from their size. Hemorrhage may be a dangerous symptom unless relieved by treatment. The possibility of the presence of malignant degeneration and gangrene must be kept in mind. Development in the pelvic connective tissue (subperitoneally) and pelvic peritoneal adhesions or exudates render the prognosis more unfavorable and call for early operative interference.

Slow growth.
Danger to life.
Size.
Hemorrhage.
Malignant degeneration.
In connective tissue.
Adhesions, etc.

13. **Treatment.** The treatment may be divided into the palliative and radical. Since the condition, unless neglected, is seldom attended by a fatal result, the palliative treatment is often all that is required. A symptomatic cure is frequently effected thereby.

Two kinds.
Palliative.
Symptomatic cure.

Three indications. The palliative treatment consists of (1) the cure of the endometritis, (2) the diminution of the blood supply, and (3) the artificial induction of the menopause.

Objects. The objects accomplished by the palliative treatment consist in relief from hemorrhage and pain and arrest of growth or diminution in size of the tumor or tumors.

Curettage. Dilation. Electricity. 14. The *endometritis* may be treated by repeated curettage, dilation of the cervix, and, if necessary, intra-uterine applications as recommended in the chapter on "Hyperplasia of the Uterus" (part VII, chap. VIII, par. 12, and chap. IX, par. 15 and 16) or by electricity.

Curettage, particularly if repeated, usually diminishes the hemorrhage, and may be all that is necessary in slow-growing tumors, particularly those in patients over forty years old, in whom the menopause may be expected to arrest their growth.

Diminish hemorrhage. Relieve vascularity. Strength of current. Positive pole. Negative. Duration. Touch every part. Several sittings. After menses normal. 15. *Electricity* may be made to relieve the endometritis and the vascularity of the submucous tissue, and thus diminish hemorrhage, and to a certain extent relieve the vascularity about the tumor. It is well to commence with 50 milliampères three times weekly and work up gradually to 100 for small, and even higher for large, tumors. In hemorrhagic cases the positive pole is used in the uterus, as it coagulates and hardens the tissues; for those cases without hemorrhage, the negative pole is used at least a part of the time. The applications should last from three to five minutes. The intra-uterine electrode is made to touch every portion of the endometrium. This, however, usually requires several sittings, a portion only being treated each time. After the menses become normal or somewhat scanty, a few more treatments, four or five days apart, may be made before the patient is discharged.

Effect upon the size. Hemorrhage, pain. Return of bleeding. It is not to be expected that the tumors will diminish very much in size, but the hemorrhage and pain should be relieved, while upon a return of the bleeding the applications may again be made as before. If, however, the tumors have in the meantime increased in size, other treatment should receive consideration. Increase in size.

Acute or subacute pelvic inflammation and pus in the pelvis are contraindications to the use of electricity. Contraindications.

Some pain may follow the first few applications, and the hemorrhage may be increased until the entire endometrium has been cauterized, after which decided improvement is to be expected.

The method of using the battery must be studied in special treatises (F. H. Martin, Massey, Apostoli). The principle consists in using a small gold- or platinum-plated sound, insulated to within an inch, or about three cm., of the point, for the purpose of concentrating the current in the uterus, and a large, flat, external electrode to diffuse it on the surface and prevent surface irritation.

Extreme antiseptic precautions must be observed in the vaginal manipulations.

In skilled aseptic hands intra-uterine electrolysis is attended with but little danger. Electropuncture is, however, too dangerous for ordinary use.

I have not referred to any other therapeutic action of electricity except that directly upon the endometrium and indirectly upon the uterine congestion, as no other has yet been proven.

16. *Diminution of the blood supply* has been accomplished by the use of ergot, splitting the cervix, and ligature of the uterine and ovarian arteries. Means.

A reliable fluid extract of ergot may be given in half-teaspoonful doses three times daily for many months without constitutional bad effects, and usually with a decided diminution in the hemorrhage and some decrease in the size of the tumors, particularly the soft intramural ones. It sometimes causes expulsion of the submucous and polypoid varieties (W. H. Byford), and, exceptionally, gangrene of the capsule or even the whole tumor (see radical treatment, par. 19). If the stomach is sickened by it, a teaspoonful diluted in three or four ounces (100 c.c.) of water may be given twice daily per rectum; or three grains (0.20 gm.) of ergotin in capsule may Ergot. Effects. Per rectum. Ergotin.

be given three times daily by the stomach. It is seldom necessary to give it hypodermically.

Hypodermically.

The fluid extract of hydrastis canadensis has been known to diminish the uterine hemorrhage, but does not have any appreciable effect in diminishing the size of the tumors.

Diminishes hemorrhage.

Good effects have been noticed from splitting the cervix on either side high enough to sever the branches of the uterine arteries that enter its upper portion, and thus diminish the blood supply to the uterus. The procedure has fallen into disuse, as it is not as reliable as other remedies.

For the temporary relief of serious hemorrhage, see part IV, chap. III, par. 5.

Vaginal incisions. Steps. Incision, etc.

17. The uterine arteries may be tied through vaginal incisions. (F. H. Martin, Dorsett, Gottschalk.) An incision is made on either side of the cervix, the connective tissue pushed away from the cervix by the finger or a knife-handle, until the uterine artery can be felt pulsating. It is then tied with strong catgut or fine, well-sterilized silk, and severed. Martin ligates the broad ligaments for some distance up, and has even included the ovarian artery on one side in a few cases. The parts are then disinfected with a 1 : 2000 solution of corrosive mercuric chlorid, and the vaginal incision closed. The good effects are often, although not always, immediate and striking. In skilled hands the operation is not dangerous.

Ligation. Broad ligament. Ovarian. Disinfection, etc. Good effects.

F. Byron Robinson has opened the abdomen and ligatured both broad ligaments beside the uterus down as far as the uterine arteries, even including one.

Abdominal method.

These measures are most useful when the uterus is still of moderate size, yet is vascular and bleeds excessively.

Moderate size, etc.

18. *The artificial induction of the menopause* consists in removing the ovaries. This must usually be done by means of an abdominal incision the same as described for the treatment of incurable disease of the uterine adnexa (part VII, chap. XI, par. 13). It is well at the same time to ligate the broad ligament as near the uterus as possible for some distance

Removing the ovaries. Abdominal incision. Broad ligament.

farther down (Robinson), in order to diminish the blood supply and hasten senile changes. The remedy is usually, although not always, efficacious in cases of tumors smaller than a fetal head, although the good effects do not always immediately follow it. The hemorrhages either gradually or suddenly cease, and the tumors diminish in size. The mortality in selected cases is somewhat less than in removal of the uterus.

Efficacy.

Hemorrhages.

Size.

Mortality.

When the uterus is much enlarged the abdominal incision should be made in the median line over the upper portion of the mass, and must often be larger than that of ordinary oophorectomy. Sometimes the uterus must be drawn through the incision before the adnexa can be reached.

Development of the tumor in the broad ligament, pyosalpinx, or abscess of the ovary may make the operation more difficult and dangerous than removal of the entire uterus.

19. The *radical treatment* consists in the removal of the tumor or tumors, or of that part of the uterus that contains the tumors, or of the whole uterus.

Removal.

Cervical myomata are not amenable to palliative treatment, and should be removed. When they are small and hang from the cervical canal, they may be twisted off. If the tumor and pedicle are large, the capsule is incised all around a short distance from the cervical walls and, after the tumor is twisted or cut off, is sewed over the base. Intramural cervical myomata should have their capsules incised and be enucleated. The tissues are then trimmed and the raw surfaces coapted by deep sutures. When this can not be done, the bed of the tumor and the vagina should be packed tightly with strips of iodoform gauze, or of gauze squeezed out of the solution of ferric subsulphate (Monsel's solution), for the enlarged, lacerated cervix has a tendency to bleed. If the culdesac of Douglas is opened, the peritoneum and connective tissue should be sutured with catgut.

Removal.

Hanging from cervix.

Large pedicle.

Intramural.

Enucleation and suture.

Packing.

Tendency to bleed.

When the tumor fills the vagina to the extent that the pedicle can not be reached, it may be reduced by cutting it in pieces (morselation).

Cutting in pieces.

Small and moderate-sized tumors projecting from the supervaginal portion of the cervix into the culdesac of Douglas, or into the pelvic connective tissue, can be removed per vaginam through an incision in front of or behind the cervix, or by a lateral incision with or without ligation of the uterine artery. In case of lateral incision it is better to pass a guide or sound into the ureter as a preliminary step (part I, chap. IV, par. 5).

Projecting from cervix. Vaginal section. Uterine artery. Ureter.

20. *Intra-uterine polypi* smaller than a child's head should be removed in the same way as the cervical. The cervix must, however, be dilated before the pedicle can be reached. The patient is anesthetized, the cervix dilated as wide as possible by steel dilators, or by rubber bags which are covered by or contain a silk bag. The tumor is grasped by vulsella, and, if too large to be brought down, is cut by strong scissors into halves, or into many pieces, until the remnant is so small that the pedicle can be reached and cut. The hemorrhage is seldom significant. If the cervix lacerates it should be sutured.

Same as cervical. Dilation. Method. Cut in pieces. Pedicle. Hemorrhage. Sutures.

In some cases it may be necessary to further enlarge the dilated cervix by splitting it to the vaginal junction on both sides; or by splitting the anterior wall of the cervix to or beyond the internal os. To do the latter, a transverse incision must be made along the edge of the anterior wall of the cervix, and the bladder be pushed up from its cervical attachments as far as the incision is to reach.

21. *Sessile submucous myomata* smaller than a cocoanut should be removed as soon as they are diagnosed. The capsule is incised and the tumor enucleated with the fingers, scissors being used only for the purpose of cutting long shreds of tissue. When, however, it is too large to be enucleated through the dilated cervix, it may be made smaller by morselation, and the remnant enucleated. The capsule must

Incision. Enucleation. Morselation. Capsule.

be cut off close to the uterine walls, leaving no remnant that would be liable to slough. The uterus should be packed with iodoform gauze for twenty-four hours, and half a teaspoonful of fluid extract of ergot be given every three hours to prevent hemorrhage.

Packing.

Ergot.

As it is difficult to mechanically dilate the cervix sufficiently, I have often succeeded in securing considerable preliminary dilation by giving from a half to one teaspoonful of fluid extract of ergot four times daily until uterine contractions were produced and the polypus was forced into the cervix or partly through it. The sessile tumors are forced down in the same way. The contraction of the uterine walls diminishes the size of the uterine attachment, and often renders them more or less polypoid, and hence easily removed. (W. H. Byford.) I have twice seen intra-uterine electrolysis induce contractions with a similar effect. Dilation of the cervix by tents is not advisable, except in hospital practice, on account of the dangers of sepsis.

Polypoid and submucous tumors much larger than a fetal head at term should in nearly all cases be removed by abdominal section.

In cases in which the tumor is intramural and the uterine cavity large, Vulliet dilates the cavity with long, conical sponge-tents, the base of one being at the fundus, that of the other at the external os. After their removal the cavity is irrigated and packed with sterilized cotton. At the end of two days this is removed, and the mucous membrane over the tumor is incised, guided by the finger, and the uterus irrigated with an antiseptic solution and packed with iodoform gauze. The next day ergot is given and electricity used to cause the growth to become polypoid or expel it altogether. As this takes some days, vaginal and intrauterine irrigations should be used two or three times daily. (Cumston.)*

22. *Subserous pediculated tumors* do not always grow to a large size, and require removal only when they produce pressure symptoms, or are observed to be growing at a rate that would lead us to expect future trouble. Small tumors growing from the anterior or posterior wall can be removed through a transverse incision behind the cervix or a T-shaped incision in front of the cervix with separation of the bladder from the uterus. (See part VII, chap. XI, par. 12.) When the tumor is

Pressure.

Rapid growth.

Vaginal section.

---

* *Annals of Gynecology and Pediatry*, Jan., 1895.

Abdominal. Large pedicle. Methods. Sutures. Without a pedicle.

large, the abdomen must be opened, and the pedicle, if small, ligated with strong silk. When the pedicle is large its capsule may be incised a short distance from the uterus, its fibrous tissue enucleated, and the capsule sewed over the base firmly enough to check all oozing. In some cases it is easier to cut the pedicle wedge-shaped with the thin edge extending to or into the uterine wall, and sew up the flaps that are left. Catgut sutures in buried rows, and a superficial row of fine silk sutures, may be used. A subserous tumor without a pedicle may be enucleated, and its bed sewed up with buried rows of catgut and a superficial row of fine silk.

Enucleation. Elastic ligature. Longitudinal incision. Size. Hemorrhage.

23. *Intramural myomata*, if single, can be enucleated the same as the subperitoneal by first placing an elastic ligature (A. Martin) around the uterus below them and then incising their capsule in a longitudinal direction. It is seldom necessary to remove such tumors until they are larger than a fetal head, but if they are growing rapidly they should not be allowed to become much larger. Uncontrollable hemorrhage may call for their removal earlier.

Quite a large mortality has so far attended the enucleation of large tumors. E. C. Dudley recommends stitching the bed into the abdominal incision, when favorably located, and its treatment as an open wound. The bed may sometimes be sewed up with buried sutures and rendered extraperitoneal by stitching the parietal peritoneum to the uterus with catgut on either side of the uterine incision. The abdominal incision is then united as usual over them, the external sutures grasping the edges of the uterine incision. Senn (Transactions Chicago Gyn. Soc., Dec., 1894) anchors the uterus with pins and packs the wound with gauze. On the third day, when all oozing has ceased, the wound is closed with sutures. A. Martin thinks that there is no advantage gained by ventrofixation in such cases.

Abdominal section. Mucous membrane. Tampon.

24. *Large submucous myomata* are to be removed by abdominal section in the same manner as the intramural growths (par. 23). The mucous membrane, after the enucleation, is incised (if not already torn) and the bleeding bed tamponed

with strips of iodoform gauze which extend into the vagina. The incised uterine wall is then united firmly over the packing with catgut sutures, and the inverted peritoneal edges over them. (Senn.) The gauze is removed in five days. When, however, the whole bed can be accurately sewed up, such is, of course, preferable. (A. Martin.)

Uterine incision.

Gauze.

Sewing up bed.

25. *Multiple myomata* and *large single tumors* that can not be enucleated must be removed either by complete or partial hysterectomy. When the symptoms are serious and resist treatment, or when the growth of the tumors is rapid, they should not be allowed to attain a large size, or through their symptoms to undermine the patient's health to a great extent.

Hysterectomy.

Serious symptoms and rapid growth.

When the uterus and the tumors are no larger than a fetal head at term, they are best removed by vaginal hysterectomy. (Leopold.) (See hysterectomy for cancer of the cervix, part IX, chap. III, par. 23.) In such cases it is sometimes necessary to bisect the uterus longitudinally (P. Miller), or to cut it away in sections after having ligated or clamped the vessels supplying each section. (Péan.) The bloodless method may be used for small uteri (part VI, chap. V, par. 19).

Vaginal hysterectomy.

Bisection.

Cut in sections.

Bloodless method.

26. When the *uterus* is *larger than a fetal head* at term, the abdomen should be opened by a median-line incision extending from just below or above the umbilicus down to within an inch or less of the symphysis pubis. The tumor is delivered, and the broad ligaments tied in sections from the suspensory ligament of the ovary to the edge of the uterus below the tumors, or the ovarian and uterine arteries are ligated separately. The uterus is then amputated above the lower ligatures, either just below the tumor or at the internal os.

Abdominal hysterectomy.

Incision.

Delivery.

Ligation.

Amputation.

The stump thus formed may have a wedge-shaped piece cut out of it, and then be sewed up with catgut and dropped into the peritoneal cavity (intraperitoneal method). Or it may be treated extraperitoneally by stitching or clamping it into the abdominal wound, or by turning it into the vagina through

Wedge-shaped piece.

Sewing up and dropping.

Fixing in wound.

Turning into vagina.

an opening made into the anterior vaginal fornix (vaginal fixation), or by stitching the peritoneum from the bladder over the stumps, and, if there be much oozing, draining into the vagina through an opening made in front of the cervix.

Covering stumps. Vaginal drainage.

Another method is to ligate the broad ligaments down to the vaginal junction, amputate the uterus, and then remove the entire cervix (total hysterectomy). The cervix may be removed from below as in vaginal hysterectomy, or from above by cutting around it, ligating such vessels as may bleed freely, and sewing up the vaginal edges by catgut sutures. The ligatures can be left long and be drawn into the vagina for drainage, while the peritoneum is united over the stump by a fine catgut running suture.

Total hysterectomy. Cervix. Ligatures. Peritoneum.

It can not yet be decided just what procedure will finally prove the best. There are almost as many modifications of these methods as there are prominent operators.

27. The treatment of myoma of the uterus *during pregnancy* is still under discussion.

A small tumor of the anterior lip interferes but little with labor (J. F. Fry's case). A tumor of the posterior wall of the cervix should be enucleated as soon as discovered unless the pregnancy has advanced to the latter half. If the tumor is too large to enucleate in one mass, it must be cut in pieces and the uterus be removed with it. If the difficulty is too great, abdominal hysterectomy is to be preferred. In advanced pregnancy the hemorrhage attending the enucleation of a cervical myoma (Mayo Robson's case) is apt to be serious, while if it is removed during the first stage of labor the prolonged pressure of the fetal head and attenuation of the cervical tissues tend to prevent excessive hemorrhage. In some cases the cervical tumor is drawn high enough to allow of the birth of the child. The growth should then be left for several weeks or months after labor (M. Hofmeier). Polypi should be removed by ligature and cutting of the pedicle, but not by torsion lest the softened cervix be torn.

Tumors above the internal os seldom interfere seriously with labor, and unless they extend down into the cervix, or are pelvis-bound, do not call for a sacrifice of the fetus, since from 70 to 80 per cent. may be expected to go on to term, and labor at term is but little more dangerous than induced abortion (Hofmeier). When increasing suffering or other symptoms preclude the possibility of awaiting labor at term, premature delivery of a viable child is advisable. If this can not be waited for, a hysterectomy is usually safer than induced abortion (Treub).

Multiple and submucous tumors call for hysterectomy. Pediculated myomata, and sometimes subserous ones with broad bases, may be removed during pregnancy without sacrificing the uterus, or, if favorably situated, may be removed in connection with Cesarean section.

The rapid growth of fibroids during pregnancy is more or less counterbalanced by a corresponding diminution in size during uterine involution.

CHAPTER III.

MYOMA OF THE FALLOPIAN TUBE, FIBROMA OF THE OVARY.

1. **Myoma of the Fallopian Tube.** But few cases of myoma of the Fallopian tube have been observed. Simpson met with one case the size of a fetal head. Schwarz reported one originating at the junction of the tube with the uterus. Spaeth reported a fibroid enlargement of the middle and distal end of the tube. Rarity. Enumeration.

The *diagnosis* can not be made with certainty except by the aid of an exploratory incision (part I, chap. IV, par. 8). Exploratory incision.

The *treatment* consists in removal by peritoneal section.

2. **Fibroma of the ovary** occurs in the form of a fibroid proliferation of the stroma, and is not encapsulated. It is usually unilateral and small in size, although occasionally large, and may involve a portion or all of the ovary. It is hard and nodular, and composed of fibrillar connective tissue, and sometimes contains unstriped muscular fibers (fibromyoma). The follicles are generally obliterated, but small cyst cavities (geodes) of uncertain origin form in some tumors. A small quantity of ascitic fluid is usually found in the pelvic peritoneal cavity. Form. No capsule. Unilateral. Size, etc. Gross character. Minute structure. Follicles. Ascites.

From corpus luteum.

Such tumors may also develop from the corpus luteum. (Rokitansky.) The denticulated folds of that body are recognized in their structure by the microscope.

Degeneration

Ovarian fibroma undergoes various forms of degeneration, sarcomatous (fibrosarcoma), calcareous, osseous, and cystic (fibrocystoma).

Pedicle. Sessile. Growth. Sex.

The pedicle is usually short and fleshy, and not connected with the Fallopian tube. The tumor may develop between the folds of the mesovarium and become sessile. It is of a slow growth, and is usually found in young women.

Uterine fibroid. Malignant tumors.

3. The *diagnosis* from a pediculated uterine myoma is difficult unless both ovaries, or the place of origin of the uterine pedicle, can be palpated. It is ordinarily situated farther to one side, and has a wider range of motion than the uterine tumor. Malignant solid ovarian tumors grow faster, and are apt to be bilateral, and in the later stages are accompanied by ascites, infiltration of the broad ligament, and metastatic deposits.

Growth. Degeneration.

The *prognosis* is unfavorable on account of continued growth and the danger of sarcomatous degeneration.

Removal.

Treatment. They should be removed by abdominal section as soon as discovered.

CHAPTER IV.

MYOMA OF THE ROUND LIGAMENT, OVARIAN LIGAMENT, AND BROAD LIGAMENT.

Rarity. Varieties. Frequency. Location.

1. **Myomata of the round ligament** are very rare. A myxofibroma (Duplay), fibro-myosarcoma (Sänger), and myoma lymphangiectodes (Leopold), have been observed. Not more than four or five cases are on record of such tumors situated within the peritoneal cavity, the usual location being at the external inguinal ring and labium majus.

The *diagnosis* of those situated within the peritoneal cavity is usually impossible. Those developed externally are differentiated from the various forms of hernia by their irreducibility, the absence of succussion upon coughing, absence of tenderness, and the slight increase in size and tenderness during the menstrual period. Glandular enlargement is recognized by its nodular characteristics, and sometimes by the affection of neighboring glands. Congenital hernia of the ovary is known by the shape of the ovary, the fact that it has always been there, by dysmenorrhea, and by the characteristic pain evoked upon firm pressure. The tumor of the round ligament lies often more or less loose in or above the labium majus, as if pediculated from the external abdominal ring. Rapid growth indicates malignancy.

Within peritoneal cavity. External. Physical signs. Glands. Hernia of ovary. In labium majus. Malignancy.

The *treatment* consists in incision, ligation of the round ligament, extirpation of the tumor, and suture of the wound.

Ligation, extirpation, etc.

2. A few cases of **myoma** growing from the **ovarian ligament** have been reported, one by Doran weighing 16 pounds (eight kilos). Their diagnosis and treatment are the same as those of fibroma of the ovary.

Few cases. Fibroma of ovary.

3. **Myomata of the broad ligament** are occasionally observed. Whether they develop from the tissue of the ligament primarily, or are developed from migratory fibroid bodies from the uterus, or both, has not been definitely determined.

Occasional. Origin.

The *diagnosis* is the same as that of cystic tumors of the broad ligament, excepting the fact that they are solid. When they are large their place of origin can not be discovered.

Cystic tumors. When large.

The *treatment* consists in enucleation. The resulting cavity of the broad ligament is treated the same as that left after enucleation of a broad ligament cyst (part XII, chap. III, par. 4).

Enucleation. Broad ligament cyst.

PART TWELVE.

CYSTIC TUMORS.

CHAPTER I.

CYSTIC TUMORS OF THE VULVA, VAGINA, AND UTERUS.

Retention cysts.

1. **Cysts of the glands of the labia majora** and vestibule occasionally attain the size of a walnut. They should be removed, and the raw surfaces sutured. Small ones may be incised and cauterized. (Part VII, chap. I, par. 6.)

Cysts of the vulvovaginal glands (Fig. 195) are in nearly all cases retention cysts, and have been considered elsewhere (part VII, chap. II, par. 1).

Encysted blood in the labium majus has been described in part V, chap. I, par. 2.

Cysts of the cervix due to inflammation of the follicles have been described in part VII, chap. VII, par. 4.

Peritoneal sac.

2. **Hydrocele of the labium majus** is an accumulation of fluid in a prolongation of the canal of Nuck. The peritoneal sac extends along the round ligament into the labium majus, forming, when filled with peritoneal fluid, a labial tumor. The upper part of the labium is enlarged, as in hernia, but the fullness within the border of the ring is absent. If the neck of the sac is not closed, the mass is reducible, and varies with abdominal pressure like a hernia. If not reducible, the tumor is elastic, translucent, is not tender, and yields a clear serum on aspiration.

Diagnosis from hernia.

Aspiration.

The *treatment* when the peritoneal cavity is shut off consists in aspiration, and, if the fluid reaccumulates, in a second

Injection of iodin. Excision.

aspiration, and the injection of the tincture of iodin. If this fails, the sac may be dissected out of the labium, and the parts sutured with silkworm-gut.

Truss. Operation.

When the sac communicates with the peritoneal cavity, a truss may be worn, or the neck obliterated by cutting down on the external inguinal ring, severing the sac, and uniting the pillars of the ring over the stump.

Cystic tumors have been observed in the connective tissue of the labium majus, and in the substance of the round ligament.

Small congenital cysts of the hymen, the result of an imperfect union of the two layers (Doederlein), leaving between them a cystic space, have been observed. Bastelberger believes such cysts to be due to a folding in of epithelial cells of the surface, or crypt formation, and separation of the inclosed cells from the superficial layer.

Contents. Size. Number.

3. **Cysts of the vagina** are accumulations of a clear, viscid, pale yellow fluid in the vaginal walls, forming tumors from the size of a pea to that of a large egg, which, however, may grow larger if not interfered with. They are single in about 80 per cent. of cases (Poupinel).

Cyst wall. Epithelium. Papillæ, etc.

The cyst wall is composed of fibrillar connective tissue, which often contains muscular fibers. It is lined in some cases with cylindrical epithelium that is occasionally ciliated; in others it is lined with the pavement variety. Papillæ on the internal surface and adenoid degeneration of the cyst wall (Kleinwachter) have been observed.

Origin.

The origin is supposed to be the remains of the canals of Gärtner (Veit). Remains of an ununited duct of Müller (part III, chap. IV, par. 3 and 4) may give rise to them in some cases; in others, glandular development or crypt formation in the vaginal wall.

Palpation. Aspiration. Differentiation.

4. The *diagnosis* is made by the discovery of a rounded elastic tumor on the vaginal wall, which yields a clear fluid on aspiration. It is differentiated from a cystocele or rectocele by introducing a finger into the rectum or a catheter

into the bladder, and palpating against a finger in the vagina.

Enucleation.
Suture of bed.
Partial removal.

5. The *treatment* consists in making an incision over the tumor and enucleating the entire cyst wall if possible. The bed should then be sewed up with buried catgut or deep silkworm-gut sutures. When situated high up in the vagina, and of large size, we should remove a large portion of the cyst wall, cauterize the remainder with carbolic acid, and pack it with iodoform gauze.

Size.
Contents.
Resemblance.
Degenerated fibroids.
From canal of Gärtner.
Retention cysts.
Size.

6. **Cystic tumors of the uterine wall** have been observed up to the size of an adult head. They usually contain a viscid or thick fluid of a grayish, chocolate or yellowish color. In some cases its resemblance to pus has caused the tumor to be mistaken for an abscess of the uterine wall. Their discovery in connection with fibroids makes it probable that some of them are degenerated fibroids, even when no fibroid masses are found. It is also probable that such tumors may result from cyst formation in a canal of Gärtner. (Fischel, Klein.) Retention cysts may grow into the uterine wall as the result of endometritis. These are usually small. (See mucous polypi, part VII, chap. VII, par. 2; also part VII, chap. VIII, par. 2.)

Excision of part of wall.
Peritoneal incision.
Packing.
Vaginal drainage.
Removal of gauze.
Stitching edges into abdominal wound.

Treatment. If the tumor can be reached through the dilated cervix, a portion of the cyst wall and endometrium may be excised at the most dependent part. If discovered after the peritoneum has been opened, it may be incised and evacuated from the peritoneal side, the uterine cavity opened, the cavity packed with gauze extending into the uterus and vagina, and the incision on the peritoneal side be closed with deep and superficial sutures. A third of the gauze is removed each succeeding day. In some cases the cyst has been opened from the peritoneal side and treated extraperitoneally by stitching the cut edges into the abdominal wound and packing with gauze. (Merriman.)

CHAPTER II.

CYSTIC TUMORS OF THE OVARY.

1. There are three varieties of cystic tumors of the ovary—simple cysts, proliferating cysts, and dermoid cysts. The proliferating cysts may be of a glandular, papillary, or mixed character. Varieties.

2. **Pathological Anatomy.** *Simple cysts* (Hydrops follicularis). Leaving out of consideration the small follicular cysts which have been described in connection with oophoritis, we meet with cysts developed from the follicles which are from the size of an orange up to that of a man's head. They are thin-walled and of a white or pearly blue color, fluctuate upon a slight touch, and are usually monocystic. Similar cysts may develop from the corpus luteum after the blood has been absorbed. (Rokitanski.) Occasionally a number of small cysts are formed together, assuming somewhat the appearance of a bunch of grapes. Follicular cysts. Size. Qualities. Corpus luteum cysts. In bunches.

The fluid is a clear serum containing paralbumin and a few granules; that of corpus luteum cysts is apt to be a trifle thicker, and colored yellow or brownish by the remains of the bloody contents. It is not coagulated by heat. The smaller cysts often contain an ovum. Fluid. Corpus luteum variety. Coagulation. Ovum.

The wall is composed of two layers of dense connective tissue united by loose connective tissue in which the blood-vessels are contained. Both the outside and the inside of the cyst are originally covered by cylindrical epithelium. The inner wall of the corpus luteum cyst is usually of a rusty or orange hue, and folded as in corpora lutea, and can be easily separated from the deeper layer. Microscopically, the inner coat is composed of a dense network of capillary loops, enclos- Walls. Epithelium. Of corpus luteum cysts. Microscopical anatomy.

ing large, variously pigmented globular cells, intermixed with leukocytes. (Fraenkel.)

Development.

Variations.

Epithelial development.

Connective-tissue development.

From follicles.

3. The *proliferating cystomas* are developed (part III, chap. I, par. 2) from Pflüger's ducts (Waldeyer) or from the epithelial covering of the ovary (Malassez and de Sinéty). The variations in the relative development of the epithelial and connective-tissue elements give rise to the different forms which the tumors assume, in the glandular cystoma the epithelial development, in the papillary cystoma the connective-tissue development predominating. Recent observations by Williams and others would make it seem probable that these tumors may also be developed from the follicles.

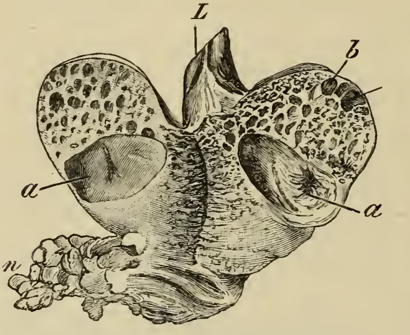


Fig. 316.—Beginning Proliferating Cystoma of Ovary (natural size). (*Winckel.*)
a, a. Large cyst. *b.* Small cyst. *n.* Fimbriæ. *L.* Ovarian ligament.

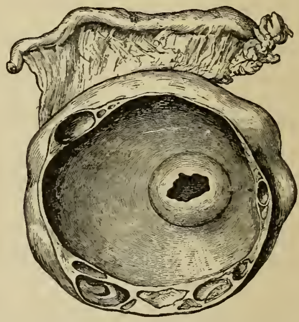


Fig. 317.—Ovarian Cyst with Secondary Development of Smaller Cysts in its Walls. (*Doran.*)
One small cyst is seen which has ruptured into the larger cyst

Cyst walls.

Development of secondary cysts.

4. The *simple proliferating or myxoid cystic tumor* (cystoma ovarii proliferum glandulare) consists of one or more cysts with firm whitish or pearly gray walls which are divided into the same layers as the simple cysts (par. 2). Ordinarily there is one large cyst with several smaller ones developed on its inner wall which, after attaining considerable size, are apt to rupture into the larger one with final obliteration of their septa.

The remains of these septa are nearly always found on the large cyst wall. Sometimes several of the secondary cysts attain a large size. In rare instances the tumor may be a mass of trabeculated connective tissue whose interstices are filled with fluid. In other cases the secondary cysts push the external cyst wall before them and form projecting cysts, or a mass of small pedunculated cysts.

Septa.

Size of secondary cysts.

Trabeculated tissue.

Multiple pedunculated cysts.

The tumor may grow almost indefinitely until it destroys the patient, and has been known to weigh over 100 pounds (from 40 to 80 kilograms).

Size.

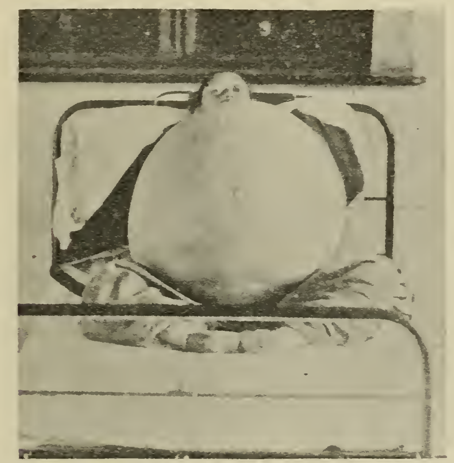


FIG. 318.—OVARIAN CYSTOMA, WEIGHING ABOUT 182 POUNDS, SUCCESSFULLY REMOVED BY ELIZA REIFSNYDER, SHANGHAI. (*J. Price.*)

Its shape is usually round or ovoid, and may present slight elevations on its surface corresponding to small cysts in its wall, or it may be furrowed by the partitions between larger cysts (Fig. 319). Large tumors press upon the surrounding tissues and contract adhesions with the uterus, abdominal walls, omentum, and abdominal viscera.

Shape and conformation.

Pressure and adhesions.

The fluid in the cyst is usually somewhat viscid, but may

Consistency of fluid.

Color. be as thin as serum or almost solid. It may be yellow, gray, green, or brown, and the color as well as consistency may vary in different cysts of the same tumor. Qualities. It is alkaline, is coagulated by alcohol and by heat, and does not readily decompose. Composition. It contains albuminous and mucous (pseudomucin) substance, the latter being a secretion of the epithelial cells. (Pfannenstiel.)

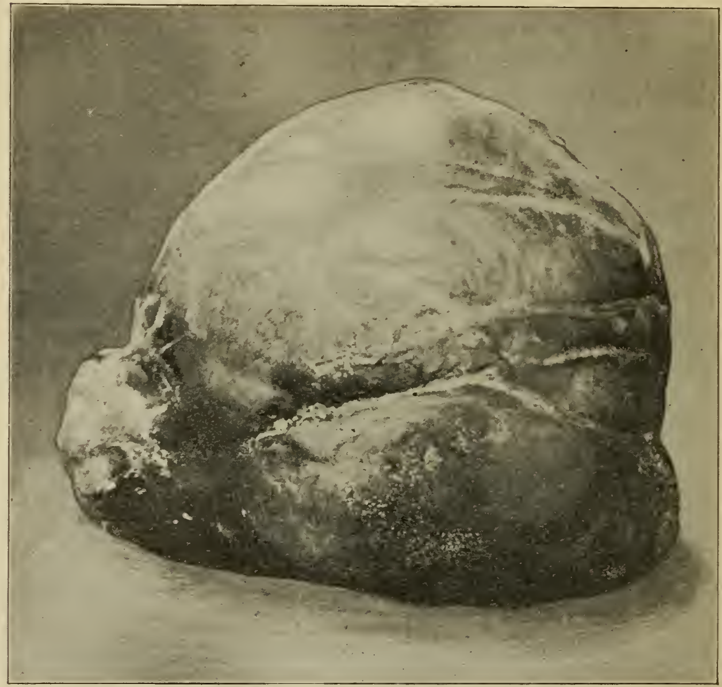


Fig. 319.—Ovarian Cystoma, Weighing 52 Pounds. (*R. W. Crothers, M.D.*)

Contents of fluid. It contains epithelial cells, blood-corpuscles, spindle-shaped cells, granular cells, granular matter, fat globules, crystals of cholesterin, and many other formed elements. Drysdale's corpuscle. Drysdale's corpuscle is a globular or polyhedral body containing several shiny granules. Garrigues, after careful investigation, considers them to be epithelial cells in a state of fatty degeneration.

Inner surface.

Epithelium.

The inner surface of the cyst wall often has a rough, corrugated appearance, like the interior of the stomach (Klebs). The epithelium is mainly cylindrical, but goblet-shaped and flat cells are also found. The growth of cells is exuberant and atypical, and results in the formation of closed pouches in the corrugated cyst lining. These become filled with cells and later with fluid, and thus form the secondary pouches which, when they persist, may develop similar secondary pouches on their inner surfaces. This cell formation some-

Growth of cells.

Secondary pouches.

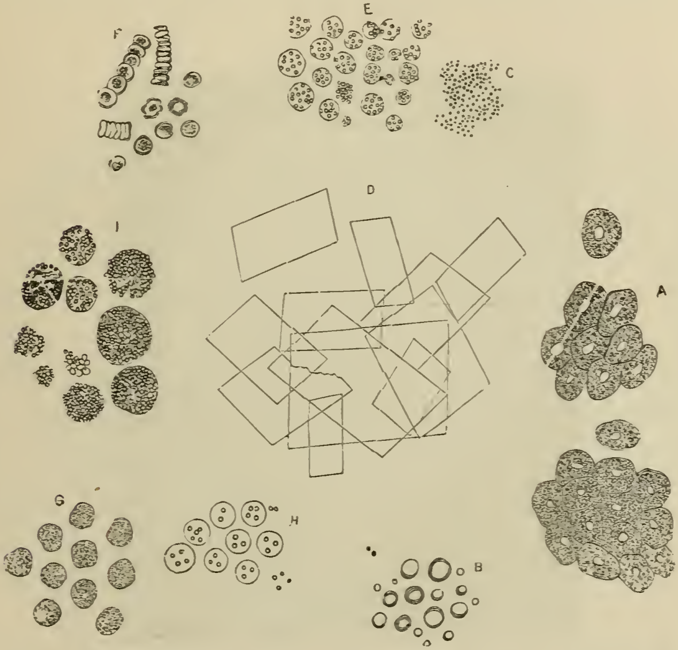


Fig. 320.—Microscopic Examination of Fluid from Ovarian Tumors. (*Atlee.*)
A. Epithelial cells of various forms. B. Oil globules. C. Fine granular matter. D. Crystals of cholesterin. E. Granular cells. F. Blood-corpuscles. G, H. Pus cells. I. Inflammatory globules of Gluge.

times invades the cyst wall and the tumor assumes the characteristics of carcinoma. In such cases ascites, adhesions, and metastases take place. In large cysts the epithelial covering is apt to be flattened, irregular, or, as is more often the case, entirely absent.

Carcinoma.

Signs.

When, in consequence of rupture of a cyst wall, thick, colloid fluid escapes into the peritoneal cavity, a mild form of peritonitis may ensue, and delicate layers of connective tissue and vessels, with endothelium proliferation, are projected into and around the unabsorbed mass. Thus a new formation resembling the original tumor may be produced. (Pseudomyxoma, Werth; gelatinous disease of the peritoneum, Péan.)

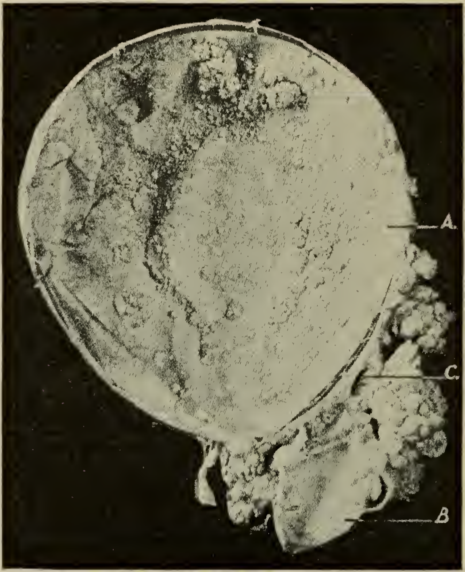


Fig. 321.—Section Through Papillomatous Ovarian Cystoma, Showing its Internal Surface. (*Freeborn.*)
A. Main cyst. B. Small cyst. C. Remains of ovary.

5. The *papillary cystic tumors* (cystoma ovarii proliferum papillare) are characterized by the growth of villi or papillæ

Growth of villi.

on the inner, sometimes on the outer, surface of the cyst wall, forming masses from the size of a pea to that of the head of a small cauliflower, which they resemble. Size and appearance.

These tumors are usually smaller and of slower development, are often bilateral, and contain fewer secondary growths than the glandular variety, and contain a thin and watery fluid in which pseudomucin is found. The amount of fluid is, as a rule, in inverse ratio to the extent of papillary growth on the lining of the cyst (Olshausen). They are supposed to originate near the hilum, and are apt to develop subperitoneally between the layers of the broad ligament. Kossman's theory, that they develop from the ciliated epithelium that extends from the tube, seems plausible. He claims that they result

Development. Fluid. Ratio Origin. From ciliated epithelium.

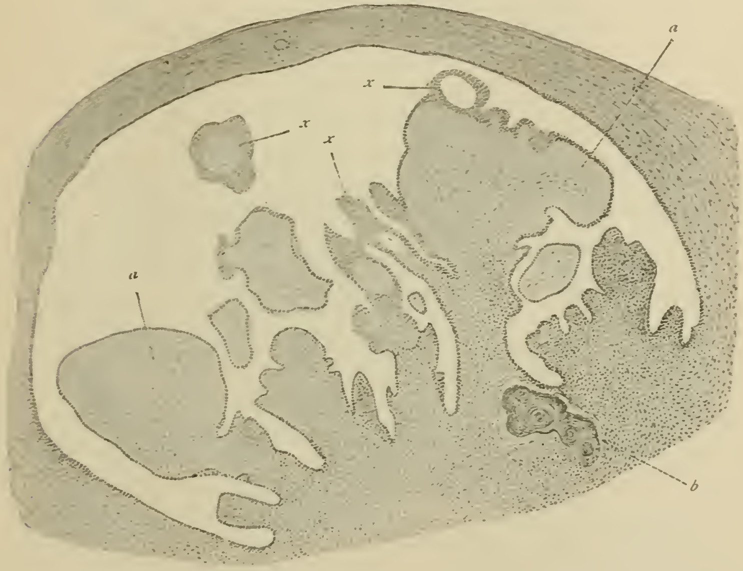


Fig. 322.—Small Papillary Ovarian Cystoma, from the Periphery of the Right Ovary. Size of an Egg. (*Pfannenstiel.*)
At x, x, x, the epithelial layer was struck transversely. *b*. Calcareous deposit in connective tissue.. Connective-tissue stroma at *a* is myxomatous.

Accessory ostia or tubes. from accessory ostia or tubes, or diverticula from the tube, extending into the mesosalpinx. *

Epithelium. The papillary growth. The epithelium lining the cyst is ciliated. The papillary growths may fill the cyst (Fig. 322), or unite and form new compartments within it, or may penetrate the cyst wall and

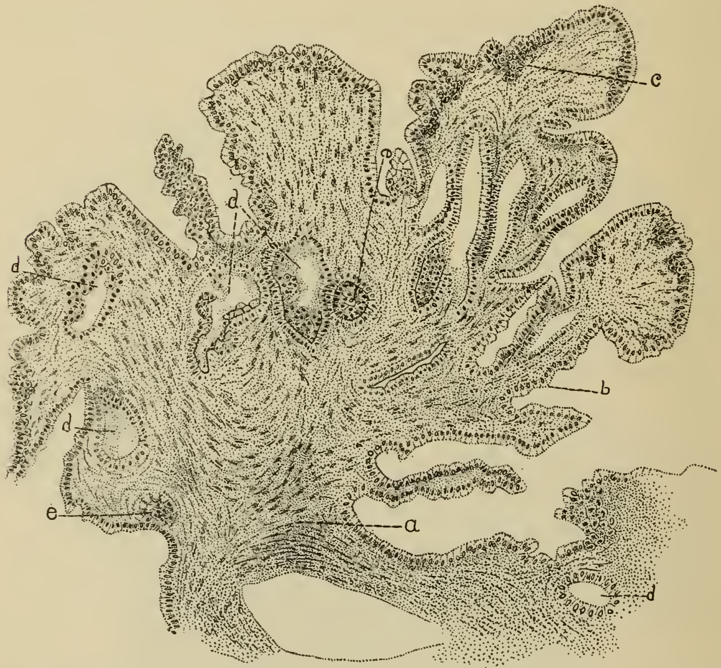


Fig. 323.—Microscopic Section of Papillary Adenocystoma of Ovary. × 110. (*Prepared by Evans from Author's Case.*)

a. Stalk of fibrous tissue. *b.* Columnar epithelium in a single layer. *c.* Columnar epithelium in more than one layer, but with no tendency to grow down. *d, d, d, d.* Section is so made that the spaces between stalks appear as glands. *e, e.* Same through bottom of spaces.

Irritation of peritoneum. Ascites. invade the surrounding tissues. The irritation of the peritoneum caused by the inflamed or perforated cyst wall gives rise to ascites, which may fill the abdomen and protect the viscera from the numerous adhesions that would otherwise form. When the cyst wall ruptures before perforation, the surrounding peritoneum becomes infected, usually with fatal results. In nearly one-half of the cases the epithelium shows the characteristic atypical proliferation of carcinoma. About ten per cent. of all ovarian tumors are papillomatous.

---

* *Monatsschrift für Geburtsh. und Gynakologie*, February, 1895.

Rupture of wall.

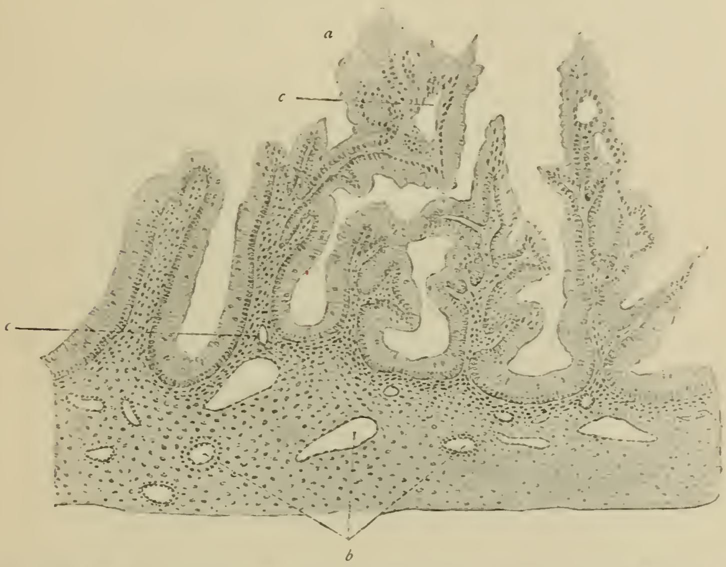


Fig. 324.—Mixed Proliferating Cystoma (Adenoma Papillare Pseudomucinosum. The Edge of a Papillary Growth on Inner Surface of a Cyst. (*Pfannenstiel.*) Compare with Fig. 277. *a.* Epithelial cells in transverse section, everywhere else in longitudinal section. *b.* Vessels of cyst wall. *c.* Vessels of the papillæ.

Papillary growths of the same nature may develop on the surface of the ovary, and about ten per cent. grow to the size of a man's fist or larger. Small cysts are usually found in or near the pedicle. In a few cases a papillary cystoma has been found on one side and a solid papillary growth on the other (Pfannenstiel). (See part XIII, chap. IV, par. 4.)

The remains of bloody extravasation are sometimes found, as well as fatty and calcareous degeneration in the walls.

Mixed variety.

6. *Mixed proliferating cystomata* are those in which both the glandular cyst formation and papillary growth occur.

Embryonic origin.
Faulty development.

7. *Dermoid cysts* are supposed to be the result of invagination of cells of the epiblast, hypoblast, or in rare cases of displaced cells of the mesoblast, in the ovary during its embryonic development. A. W. Johnstone believes them to be the result of a faulty development of the ovum. The latter is the most probable theory.

Age.

These are the most common ovarian tumors before puberty, but constitute less than four per cent. after puberty.

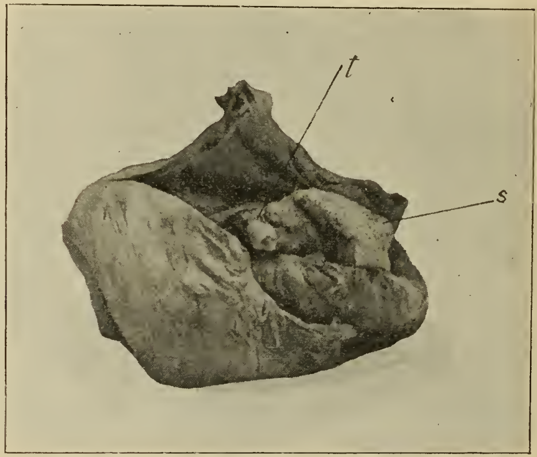


FIG. 325.—DERMOID CYST, EMPTIED AND PARTLY INVERTED. (*Author's case.*) Showing a molar tooth (*t*) and a patch of skin (*s*) from which fine hair is growing.

Size.
Number.
Growth.
Adhesions.
Infection.
Secondary cysts.

They are met with from the size of a hazelnut to that of an adult head. They are generally unilateral, although sometimes bilateral or even multiple, two or more being found in the same ovary. They grow slowly, may develop between the layers of the broad ligament, and are apt to contract adhesions and become infected. They usually consist of one main cyst, but secondary cysts may develop from the sebaceous and sudorific glands.

Contents.

The fluid contains an abundance of fat globules, cholesterin, and some urea, oxalic acid, leucin, tyrosin, nerve and brain substance, and unstriated muscular fibers. Blonde hair, in irregular masses or in long coils, is usually found, sometimes teeth (from 1 to 300) and bones, and occasionally a breast, a heart, or an eye.

Cyst wall.
Skin.
Subcutaneous fat.
External layer.

A portion or all of the inner layer of the cyst wall may be similar to that of the skin, even to the subcutaneous fat, and may be smooth or partly covered by warty prominences (Fig. 325). Next to the subcutaneous fat comes the external layer, which is usually thin, but together with the inner layer often constitutes quite a thick wall. Mucous membrane lines a portion or all of some cysts.

Complication.

The glandular proliferating cystoma is occasionally complicated by dermoid formation in one or more of the cysts.

Development.

8. Cystic ovarian tumors may be developed intraperitoneally or extraperineally (subperitoneally).

Intraperitoneal.
Pedicle.
Shape.
Twisting.
Results.
Separation.
Impaction.
Extraperitoneal.
Direction.
Peritoneum.
Uterus.

In the former variety the tumor extends into the free abdominal cavity, drawing upon the broad ligament and forming a pedicle composed of the ovarian ligament, Fallopian tube, and upper portion of the broad ligament. The pedicle may be long or short, thick or thin, without much reference to the size of the tumor. In about ten per cent. of cases it is twisted, occasionally to such an extent as to cause venous hemorrhage into one or more cysts, inflammation and adhesions of the cyst wall, and decomposition, suppuration, or even gangrene of the tumor. Complete separation of the tumor may result from such torsion, and the tumor be nourished by adhesions. If adhesions form about a small tumor it may become impacted in the pelvis. Those which develop extraperitoneally (usually the papillary variety) extend downward between the layers of the broad ligament, separating them and coming in direct contact with the walls of the pelvic viscera. As the tumor grows it strips up the peritoneum from the colon or rectum, and lifts up the uterus and bladder with it as it ascends out of the pelvic cavity. Or it may become impacted in the pelvis and exert dangerous pressure upon the pelvic viscera. These tumors, as a rule, originate in the portion of the ovary near the hilum (the paroophoron). (See Fig. 329.)

Pressure.

Origin.

Infection of peritoneal tumors may take place by way of the blood-vessels or lymphatics, from adherent intestines or diseased pelvic viscera, particularly from pyosalpinx, rectitis, cystitis, appendicitis, etc. Peritonitis and the extension of the adhesions to the entire surface of the cyst are the usual results.

9. **Etiology.** The causes of ovarian cystic tumor are unknown. They occur in the fetus and in all stages of life. Whether some form of microparasite will be found to account for some or all of them is at present impossible to determine.

Occur in fetal life.

Micro-parasite.

10. **Signs and Symptoms.** While the tumor is small it seldom gives rise to characteristic symptoms. Slight menorrhagia or dysmenorrhea, and other symptoms of chronic oophoritis, may, however, be noticed. Bilateral growths usually cause sterility.

Seldom characteristic.

Menstrual. Chronic oophoritis. Sterility.

When the tumor is developed in the broad ligament, the symptoms appear earlier and are more pronounced. Pain in the iliac region, menorrhagia, dysmenorrhea, constipation, dysuria, and pain along the gluteal and sciatic nerves may be caused by it.

In broad ligament.

Dermoid tumors, on account of their long sojourn in the pelvis, are apt, sooner or later, to contract adhesions and exhibit for a long time the above-mentioned symptoms, together with those of peritonitis and metritis.

Adhesions Chronic inflammation.

Usually the first manifestation of tumors that develop intraperitoneally is abdominal enlargement commencing in one iliac region. The abdomen increases in size, the flanks become striated as in pregnancy, and feelings of weight and pressure in the abdomen, with impaired digestion, and emaciation which is particularly noticeable about the face (facies ovariana), ensue. The

Enlargement.

Results.

veins of the abdominal walls and of the legs are often visibly enlarged, and sometimes the limbs become edematous. The lower ribs are pressed outward and the diaphragm upward, causing dyspnea and palpitation of the heart. Veins. Edema. Pressure.

Death results from exhaustion due to the interference of the tumor with the functions of the abdominal and thoracic viscera. Peritonitis, pleurisy, pneumonia, heart failure, chronic uremia, and other evidences of imperfect function and impaired circulation, one or another, may assume prominence, giving the final *coup de grâce*. Exhaustion. Other causes.

The progress may be rapid, but it is usually slow, extending over several years. They seldom stop growing. Progress.

Occasional mild attacks of abdominal pain may be caused by inflammation following more or less twisting of the pedicle, and are apt to be accompanied by the formation of adhesions.

An attack of pain and soreness in the tumor, with rapid increase in its size, nausea, and feeble pulse, followed by a rise of temperature to 101° or 102° F., denotes a twisting of the pedicle and hemorrhage into the interior, due to the obstruction of the twisted veins. The tumor assumes a darker hue, and the fluid is either chocolate-colored or clotted. Old clots are yellowish.

Sudden peritoneal pains, with a rise of temperature to 100° or 101° F., and disappearance or diminution in the size of the tumor, denote rupture and escape of the contents into the peritoneal cavity. If the fluid is thin and unirritating, the symptoms are slight, and are usually followed by a copious secretion of urine.

Persistent peritoneal pains, with a fluctuating temperature and other signs of sepsis, are due to infection of the tumor, or of fluid that may have escaped from a ruptured tumor.

Scanty urine and symptoms of renal disease sometimes result from pressure on the ureters.

Icterus, meteorism, and even obstruction of the bowels may be caused by the pressure upon the abdominal viscera.

11. **Diagnosis of Small Tumors.** When developed intraperitoneally, a small tumor is frequently overlooked. If, however, it is in the recto-uterine culdesac, it is easily felt as a rounded elastic body that can be pushed up out of reach. Overlooked. In culdesac.

When not in the culdesac, it can, unless the pedicle be very short, only be palpated bimanually. In order to differentiate from *hydrosalpinx*, the ovarian ligament which connects with the uterus must be caught between the fingers of both hands. It feels like a somewhat rigid, hard cord. In case of hydrosalpinx the flabby, ill-defined isthmus of the tube, which sometimes has a small secondary cyst in it, connects it with the uterine horn. Hydrosalpinx is softer, sometimes tender, and often convoluted or tapering toward the uterine horn. In rare instances the ovary of the same side can be palpated. The ovarian tumor gradually increases in size, while the enlarged tube does not. If adherent in the culdesac, the tumor gives rise to increasing distress, while the hydrosalpinx usually gives no more, or even less, trouble than previously. A rectal examination, with or without the aid of anesthesia, may be necessary to make these distinctions evident.

Bimanually. Ovarian ligament. Rigid cord. Isthmus. Characteristics. Ovary. Adherent Rectal examination. Anesthesia.

A *pediculated uterine myoma* is known by the attachment of its pedicle to the fundus or anterior or posterior uterine wall, and sometimes by the presence of other fibroid nodules in or on the uterine walls. Its range of motion is usually less than that of an ovarian tumor. It feels more solid. Both ovaries can be palpated.

Uterine pedicle. Nodules. Solid. Ovaries.

A *dermoid cystoma* with adhesions is round and somewhat soft or fluctuating above, with usually a hard area in the pelvis, corresponding to the dermoid or bony structure and the adhesions. If large, it elevates the uterus and pushes it forward and to the opposite side. It is sometimes situated in front of the uterus, pushing the fundus backward. It is of slow growth, and is ordinarily found in *young people*, and is apt to cause more suffering than other ovarian cysts of the same size.

Characteristics. Displacement of uterus. In front of uterus. Age. Suffering.

Pyosalpinx and *hematosalpinx* are usually hard all over instead of in places, and are situated behind and beside the congested or inflamed uterus. The appendages of the other

Induration. Position.

side are nearly always affected. If the condition is unilateral, the fundus is pushed toward the opposite side. (See part VII, chap. XI.)

Bilateral.

An *abscess of the ovary* is round, feels hard, is usually lateral, and lies between the pelvic wall and uterus, and is connected with previous pelvic peritonitis and present metritis.

Hardened. Position. History.

Hematocele and *extra-uterine* pregnancy and cystic peritonitis have their peculiar symptoms and clinical history. (See part XIV, chap. II.)

Symptoms and history.

A *retroflexed gravid uterus* is softer and less elastic, more tender, and moves with, and can usually be traced to, the cervix. The cervix is soft, patulous, and purple in color, and the symptoms of pregnancy may be present. Bimanually, the absence of the fundus from its normal position can be demonstrated.

Signs. Cervix. Symptoms. Fundus.

In a young girl, a moderate-sized tumor that has existed for some time, and is connected with symptoms of pelvic inflammation, or is situated in front of the uterus, is, as a rule, a dermoid. Encysted tubercular pelvic peritonitis, with which it might be confounded, has hard bilateral masses corresponding to the adherent tubes, emaciation, variable daily temperature, tuberculosis elsewhere, etc. (See part VIII, chap. V, par. 4 and 14.)

12. **The diagnosis of intraligamentous cystomata** must be made from cyst of the broad ligament, uterine fibroid, hematoma, pelvic inflammation, and tuberculous salpingitis.

Intraligamentous.

When so situated, the cystoma is low down beside the uterus and can not be displaced. When it fills the side of the pelvis it lies against the uterus, but is separated at the lower edge by a distinct sulcus, and is elastic and somewhat sensitive. As it grows it displaces the uterus upward and toward the opposite side anteriorly. When papillomatous, its base may be hard, and free ascitic fluid may be found in the peritoneal cavity.

Low. Fixed. Relation to uterus. Displaces uterus. Hard base. Ascites.

A *cyst of the broad ligament* is soft, fluctuant, and less sensi-

Characteristics.

Ovary.

tive. Sometimes the ovary of the same side can be discovered by the bimanual rectal examination.

Solid. Murmur. Moves with uterus. Cavity enlarged. Uterus nodular. Ovary, growth.

A *uterine myoma* projecting into the broad ligament is solid, has a venous murmur over the enlarged vessels, and moves more distinctly with slight movements of the uterus. The uterine cavity is usually enlarged, the uterus often nodular, and the ovary can sometimes be discovered. As a rule, it grows slower than the ovarian cystoma.

History. Position. Displacement of uterus. Lower down.

Hematoma and *cellulitis* have characteristic histories, and usually extend under the uterine ligaments toward the pelvic wall as palpated per rectum. Hematoma and large cellular abscesses push the uterus more forward toward the pubes or opposite inguinal ring, and reach further down between the vagina and rectum.

Difficulty. Course.

Complication with *pelvic inflammation* may make a diagnosis impossible. The mass becomes progressively larger, and the symptoms steadily worse, without the long intervals of improvement that accompany salpingitis.

Tuberculosis elsewhere. Emaciation. Resemblance.

Tuberculous salpingitis is liable to be mistaken for papilloma. The presence of tuberculosis elsewhere, early emaciation, subnormal temperature in the morning, and the closer resemblance to inflammatory disease argue in favor of the former.

Sometimes we must content ourselves with deciding that we have to deal with a condition that requires a peritoneal section. At other times we can not be sure of even this, but we can decide that the mass contains fluid and can be safely aspirated. In such cases we may introduce an aspirating needle through the vaginal wall at a place where no vessel can be felt and draw off sufficient fluid for examination. Serous fluid, blood, pus, or fat are easily recognized. The ovarian fluid is known by its viscidity, solidification by heat, its resistance to decomposition for many days, the discovery by the microscope of some of the formed elements, and by the coagulation tests.

13. **The Diagnosis of Large Cystomata.** When the cystoma has become large enough to distend the abdomen, it

must be differentiated from general *ascites.* As the patient lies on her back, the abdomen is prominent at or near the umbilicus if the former, but somewhat flattened if the latter, be present.

Ascites. Umbilicus.

If the tumor be multilocular, it may be irregular in shape, and the fluctuation is felt over limited areas, but does not extend without interruption from one side of the abdomen to the other. In ascites the fluctuation is general and more distinct.

Shape. Fluctuation.

Percussion in the dorsal decubitus gives a dull note over the umbilicus in the former, and resonance in the flanks, while the opposite is true in the latter. When the patient is turned on the side, the place of resonance changes to the uppermost side in ascites, and the umbilical region yields a dull percussion note, while the places of resonance and dullness do not change in case of cystoma. When, however, the intestines are adherent and can not move upon each other, we may have umbilical dullness in ascites. In such cases, by pressing well into the abdominal walls, we will in some instances be able to elicit a deep-seated resonance.

On back. On side. Change of resonance. Adherent intestines. Deep-seated resonance.

If there be a *circumscribed accumulation* of peritoneal fluid, due to localized peritonitis (tuberculous, malignant, etc.), the resonance will not change its place, but it will either be less regular in outline, or the dullness will in places shade off into resonance instead of ending abruptly as it does at the edge of tumors, and the fluctuation will be the more easily detected on account of the absence of a firm cyst wall.

Resonance not changed. Outline. Shades off. Fluctuation.

Large *parovarian or broad ligament cysts* present the same dull areas as cystomas, but they fluctuate as readily as ascitic fluid, and flatten slightly as the patient lies on the back, on account of having thin walls. They feel soft and fluctuant to the vaginal touch, while cystomas feel more resistant and sometimes hard, or can not be reached.

Same areas. Fluctuation. Flatten. Vaginal touch.

14. Having ascertained that there is a cystic tumor, its

Origin. Moving tumor and deep pressure. *place of origin* must be determined. By moving the tumor in different directions, at the same time that we press our fingers deeply into the abdomen under the border of the ribs, in the flanks, and iliac and pubic regions, we can often discover in Attachment. which of these regions it is attached. If it seems connected Bimanual. with the pelvis, we seek by a bimanual vaginal examination to ascertain its relation to the uterus. If it moves with the Moves with uterus. uterus, it is a soft or a cystic uterine myoma, or a cyst adher- Uterine cavity. ent to the uterus. If the uterine cavity be much deeper than normal, and the mass is felt by the hand on the abdomen to Behind pubes. pass down behind the pubes, it is probably one of the first. If Moves without uterus. it does not move with the uterus, it may be ovarian, or be connected with the uterus by a small pedicle. We should then Draw uterus down. grasp the cervix with vulsella (Hegar), draw down the uterus, and hand the forceps to an assistant, while we examine the upper portion of the uterus with our fingers in the vagina and Ovary and its ligament. rectum. We will recognize the ovary on one side, while on the other we will detect the tense ovarian ligament running Press tumor upward. upward toward the tumor, particularly if the tumor is pressed up toward the ribs by a hand on the abdomen. (B. S. Schultze.) This will often perceptibly drag up the uterus. If Ovaries and pedicle. the tumor is a pediculated uterine myoma, both ovaries will be discovered, or perhaps the pedicle itself.

Hydronephrosis, when large, simulates ovarian cystoma in that it is cystic and lies over the pelvic brim. If on the right side, the ascending colon lies over it on the inner side; while if it is on the left side the descending colon lies directly upon it. Percussion may reveal an area of resonance over it, auscultation may discover intestinal gurgling, or the bowel, if empty, may be rolled between the fingers until it contracts and becomes distinctly palpable. (Spencer Wells.) These signs are rendered more apparent by pumping air into the rectum.

Abnormalities of the urine are more apt to be present in hydronephrosis. Sometimes kidney tissue may be palpated on its posterior surface.

An attempt should be made to palpate both ovaries.

When complicated by pregnancy, there are two tumors to be felt, with the signs of pregnancy and the distress naturally caused by the fullness of the abdomen.

15. When the *whole abdomen is distended* by a fluctuating tumor, its origin is difficult to determine. Fibrocystic tumors are often mistaken for ovarian. The high position and immobility of the cervix, elongated uterine cavity, absence of the normal contour, or decided enlargement of the uterus, as palpated per vaginam, the vascular murmurs over the sides of the tumor, and the history of uterine hemorrhages would lead us to decide in favor of fibrocystic uterine tumors, although not all of these characteristics are, as a rule, manifest in the same case. Large fatty tumors from the kidney region can sometimes be differentiated by the detection of intestinal resonance or gurgling over it, or the discovery of the ovaries by rectal palpation. In fact, in all doubtful cases of abdominal tumors an attempt at rectal palpation of the ovaries, under an anesthetic, should be attempted, unless the propriety of interference or non-interference has already been determined.

Difficulty.
Fibrocystic.
Cervix.
Uterine cavity.
Enlargement.
Murmurs.
Hemorrhages.
From kidney region.
Rectal palpation of ovaries.
Anesthesia.

The diagnosis of adhesions is often difficult. Tumors much larger than a pregnant uterus at term may be supposed to have contracted adhesions. Attacks of pain and localized tenderness in some part of the tumor are apt to accompany their formation. When a large tumor is not adherent to the abdominal parietes, the umbilicus can often be made to glide over it quite easily.

16. *Exploratory puncture* is only advisable in connection with preparations for an abdominal section. *Tapping* is sometimes practised to relieve dangerous pressure, preparatory to an operation under more favorable circumstances, and enables us to examine the fluid, as well as palpate the tumor and its pedicle more satisfactorily. (See part I, chap. IV, par 6.)

Limitation.
Relief of pressure.
Preparatory.
To examine fluid.
Palpation.

17. *Exploratory incision*, either in the linea alba or recto-uterine culdesac, is of great value in the diagnosis of tumors of moderate size and of doubtful nature. It is well to be prepared to go on with the operation should such be found

Value.
Prepared to operate.

Preference. desirable. It is a less dangerous procedure in the hands of a competent gynecological surgeon than exploratory puncture or tapping. (See part I, chap. IV, par. 7 and 8.)

18. **Prognosis.** Ovarian tumors almost invariably destroy life sooner or later. Complications usually increase with the age and size of the growth, and malignant degeneration is so common that they should be removed as soon as discovered. Gradual torsion of the pedicle is said to produce arrest of growth and atrophy in rare instances.

Fatal complications. Malignancy. Gradual torsion.

19. **Treatment.** There is no curative treatment for ovarian tumors but extirpation.

Extirpation.

20. *Tapping.* When the condition of the patient is such that an operation would not be endured, attempts should be made to improve it. Tapping of very large cysts may be necessary to relieve the pressure upon the heart and digestive organs, and enable the patient to recuperate before the radical operation is undertaken. Those who, on account of other diseases, can not be expected to live long, may be made more comfortable by it. In the later months of pregnancy tapping may sometimes be resorted to in the interests of the child, since it is less liable to be followed by an abortion than ovariotomy. (See part I, chap. IV, par. 7.)

Improve the condition. Relieve pressure. Recuperation. Palliative. During pregnancy.

Tapping may cause hemorrhage by the wounding of a vessel in the peritoneum or cyst wall, or may be followed by an escape of some of the fluid into the peritoneal cavity, or by an infection of the tumor, and hence should be reserved for exceptional cases, with urgent indications, and in connection with ample preparations for an immediate ovariotomy in case an accident should happen. The fluid usually reaccumulates faster after each evacuation.

21. **Ovariotomy.** *Contraindications* to the performance of ovariotomy may be said scarcely to exist, although there may be conditions of the system that require temporary preparatory treatment for the purpose of putting the patient in a better condition.

Preparatory treatment.

It is possible, however, for the time for a successful operation to have passed, as in case of malignant tumors infecting the surrounding structures, and in extreme exhaustion, or organic disease of the abdominal or thoracic viscera due to prolonged pressure.

Too late.
Malignancy.
Exhaustion.
Organic diseases, etc.

Diseased conditions, such as peritonitis, sepsis, obstruction of the bowels, connected with changes in or about the tumor, usually call for an immediate operation.

Urgency.

22. *Abdominal Ovariotomy.* The steps of the operation are as follows, the patient lying on her back :—

Steps.

Incision in the linea alba, about three inches long, half-way between the umbilicus and pubes. (Part I, chap. IV, par. 8.)

Incision.

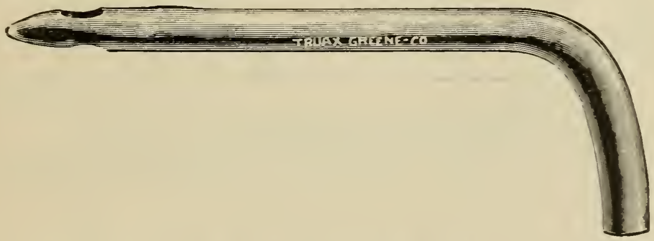


FIG. 326.—TAIT'S OVARIOTOMY TROCAR.

Separation of parietal adhesions about the incision, if such be present. Palpation of the tumor to ascertain, if possible, its relation to the uterus, bladder, and broad ligaments. Tapping the cyst with a trocar to which a rubber tube is attached to carry the fluid into a pail under the table, while an assistant keeps the abdominal walls firmly pressed against the tumor. Grasping of tumor on either side of, or just above and below, the trocar as soon as it is sufficiently flaccid. Pulling the cyst wall out on the abdominal walls, and complete delivery as soon as empty, unless other cysts or adhesions prevent. Enlarging of cyst opening so as to tap other cysts through it. Tying off of omental adhesions. Separation, or dissecting

Parietal adhesions.
Relations.
Tapping.
Grasping tumor.
Delivering.
Secondary cysts.
Adhesions.

Ligature of pedicle.
Clamping Cutting off.
Tying beneath forceps.
Other ovary.
Blood, etc.

off and leaving, such portions of the external covering of tumor as are involved in intestinal or other visceral adhesions. After delivery of cyst, tying of pedicle in two parts, or, if too short, clamping of pedicle with forceps, and cutting off tumor about two cm., or ⅔ of an inch, from the ligature or forceps. Tying of pedicle beneath forceps, the forceps being taken off as the ligature is tightened, in order to relieve all tension. Examination of remaining ovary, and its removal if similarly diseased, or if the patient has passed the menopause. Sponging of blood or fluid from the peritoneal cavity. Closure of wound by superficial and deep silkworm-gut sutures. (See part I, chap. IV, par. 2.) For operation upon tumors developed in the broad ligament see par. 4.

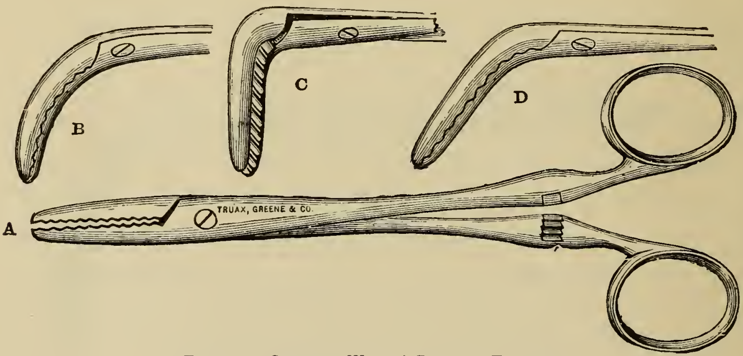


FIG. 327.—SPENCER WELLS' PEDICLE FORCEPS.

Closure of wound.

The pedicle may be tied with No. 16 twisted silk (loose twist) or No. 10 braided, or with a medium-sized reliable catgut. It should be transfixed through the ovarian ligament, the infundibulo-pelvic edge of the broad ligament, and through its center with a double thread, and be tied on each side. Then, after the tumor is cut off, or the clamp is removed, one of the threads is again tied tightly around the stump at the same place as before. The ligatures are cut off about one cm. (⅓ of an inch) or a little less from the knots, and the pedicle is dropped. When catgut is used it is well to feel for the vessels and tie them separately, or else to include only a small amount of tissue in each loop.

Oozing surfaces may be treated by sponge pressure, temporary forcipressure, suture with fine catgut, or exceptionally with mild thermocautery or the application of a little diluted Monsel's solution. Steam from a small, elongated spout of a kettle is a powerful hemostatic when applied to oozing surfaces (Snegirjoff).

If considerable oozing persists, it may be necessary to put a drainage-tube about the size of the little finger in the lower angle of the wound extending down in the recto-uterine culdesac (part I, chap. IV, par. 2).

Posterior colpotomy.

23. *Vaginal Ovariotomy.* Tumors that are smaller than an adult head and quite movable, or adherent low in the culdesac of Douglas, may be removed through an incision in the posterior vaginal fornix. The operation is the same as vaginal oophorectomy (part VII, chap. XI, par. 12), except that the tumor, which is held down by pressure over the pubes, and also caught by a hook from below, is evacuated by a trocar and, after being douched off, is pulled into the vagina. Small tumors have also been removed by anterior colpotomy.

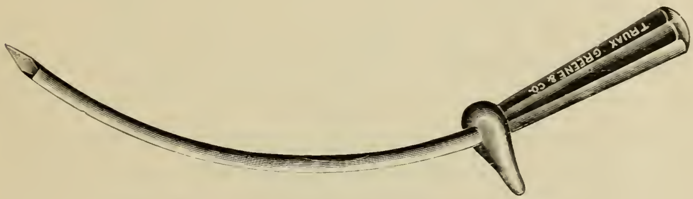


FIG. 328.—TROCAR FOR USE IN VAGINAL OVARIOTOMY.

Anterior colpotomy.

As soon as the vaginal incision is made, the operator examines the tumor and pedicle with two fingers passed into the abdominal cavity, and searches for contraindications and complications. Adhesions high up, and a thick, indurated, and friable pedicle, may be considered as such.

Enucleation.

24. *Complications.* When a tumor can not be completely removed without too much risk to the patient, its lining membrane should be enucleated, and the outer walls cut off at a level with the abdominal walls and stitched into the abdominal wound. (See treatment of tumors of broad ligament, chap.

Amputation of sac. Iodin. Packing. Tube. Irrigations.

III, par. 4.) If the lining can not be peeled out, the cysts should all be broken open, the tumor be cut off as directed above, the interior swabbed out with the tincture of iodin, the edges stitched into the wound, and the cavity packed loosely with strips of iodoform gauze (Marsupialization). After about four days the gauze should be removed and a large, double, rubber drainage-tube be inserted. The cavity should then be washed out once or twice daily with a two per cent. solution of carbolic acid until it is reduced in size, when occasional injections of the tincture of iodin will hasten its obliteration. The surface must be kept well dilated.

If after several months a fistula remain, an incision near and parallel to the old one on the side of the tumor should be made into the peritoneal cavity, and the fistulous track be dissected out.

Conditions. Remove uterus. Enucleation. Gauze packing. Gradual withdrawal.

25. *Vaginal Hysterectomy for Ovarian Tumors.* When tumors smaller than an adult head are adherent low down in the pelvis, or are developed subperitoneally, and present such signs and symptoms as lead one to infer that they could not be enucleated from above without enormous risk to life, the uterus may be removed per vaginam. Through the space thus gained the tumor should be enucleated as completely as possible, and the bottom of the pelvis be packed with iodoform gauze in order to drain the raw surfaces and spaces in which shreds of the lining membrane are adherent. The gauze is drawn out little by little, about $\frac{1}{5}$ or $\frac{1}{6}$ each day.

CHAPTER III.

CYSTS OF THE BROAD LIGAMENT. (SUBPERITONEAL CYSTS.)

PAROVARIAN CYSTS.

Origin. Varieties.

1. Cysts may arise in the tubules of the parovarium, constituting parovarian cysts, or in the substance of the broad

Size.

Other small cysts.

ligament, constituting broad ligament cysts. These cysts may grow to considerable size, and should be distinguished from the hydatid of Morgagni and small pediculated cysts the size of a pea arising from Kobelt's tubes. (Fig. 329.)

Development.

Pedicle.

Downward.

They develop between the layers of the broad ligament and may draw up the ligament until it constitutes a pedicle, but usually they develop downward between the anterior or posterior layer of the broad ligament, lifting up the peritoneum and attaching themselves loosely to the surrounding tissues, particularly the tube and ovary, which are stretched over them.

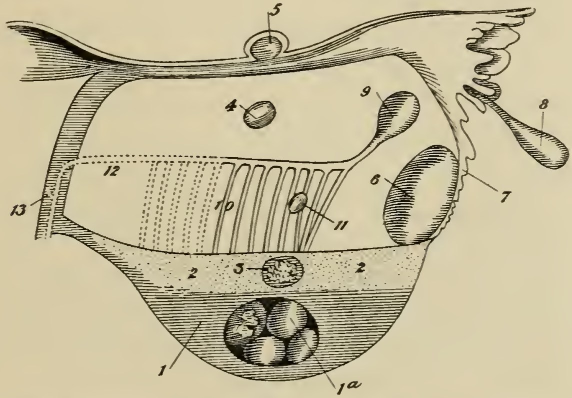


Fig. 329.—Diagram of the Structures in and Adjacent to the Broad Ligament (*Doran*).

1. Framework of the parenchyma of the ovary, seat of a simple or glandular multilocular cyst, 1 *a*. 2, 2. Tissue of hilum, with, 3, papillomatous cyst. 4. Broad ligament cyst. 5. A similar cyst above tube, but not connected with it. 6. A similar cyst developed close to 7, ovarian fimbriæ of tube. 8. The hydatid of Morgagni. 9. Cyst developed from the horizontal tube of parovarium; cysts 4, 5, 6, and 8 are always lined internally with a single layer of epithelium. 10. The parovarium. 11. A small cyst developed from a vertical tube. 12. The duct of Gärtner; often persists in the adult as a fibrous cord. 13. Tract of that duct in the uterine wall.

Cyst wall.

Glands. Epithelium.

The cyst wall is delicate, and consists of the peritoneal covering, a loose layer of connective tissue containing a few blood-vessels, some unstriped muscular fiber, occasionally glands, and a layer of cylindrical epithelium on the interior, which is sometimes ciliated, but does not communicate with the glands.

Fluid.

The fluid is thin and clear, slightly alkaline, and of a specific gravity of about 1010 or less, and yields an albuminous precipitate with nitric acid and alcohol, but not by heat alone.

Age. Growth. Action.

These cysts originate after puberty, grow slowly, and give rise to but little inconvenience until they have attained to a large size.

Uterus. Consistency. Fluctuation Unilocular. Not tender.

2. *Diagnosis.* They push the uterus to the opposite side, are softer than hematomas or cystomas of the ovary, fluctuate more readily, are unilocular, and not tender. (See diagnosis of cystic ovarian tumor, chap. VI, par. 12 and 13.)

3. The *prognosis* is better than that of ovarian cystomas, for they sometimes rupture and disappear.

Small cysts. Aspiration. Enucleation. Easily done.

4. The *treatment* is the same as that of cystic ovarian tumors, except that very small ones need not be disturbed, or, if favorably located, may be aspirated through the vaginal walls. When, upon opening the abdomen and emptying them, no pedicle is found, they should be cut off a little above the level of the broad ligament, and the lining membrane be peeled out of it. In small cysts this is quite easily done.

Bed sutured. Ligature. Vaginal drainage. Shut off peritoneal cavity. Removal of tube. Bleeding. Removal of packing.

If, after enucleation of the tumor, the whole bed can be drawn up, it can be sewed up with catgut, care being taken not to injure the ureter; or the broad fold thus secured may be ligatured in parts. When, however, the bed extends to the bottom of the pelvis, a puncture may be made into the posterior vaginal fornix, a rubber drainage-tube be passed through into the vagina, and the edges of the broad ligament be sewed together so as to shut off the peritoneal cavity. The tube should be taken out in forty-eight hours. If there is much bleeding, the bottom of the cavity can be packed with strips of gauze, and the lower end be brought out into the vagina. About one-third of it should be pulled out each day.

When such treatment is not practicable, the cut edges of the broad ligament may be puckered together and sewed into the lower portion of the abdominal wound, and the cavity be packed with a continuous strip of iodoform gauze two inches wide. A gauze dressing is put over the wound and renewed every four or six hours. Each time the wound is dressed a few inches of the gauze is drawn out, with the end in view of getting it all out during the third twenty-four hours. The blood that is forced to the surface at each dressing is pressed out and absorbed with cotton pledgets. In this way the fluid is drained away, and the wound permitted to contract and heal without suppuration. When the last of the gauze is removed, a fresh srrip is introduced barely through the abdominal walls and is left for six hours, and may be replaced once if its removal indicates the presence of free fluid in the wound cavity. After that, fresh gauze dressings are applied over the wound and between the ununited cutaneous edges every eight hours until the slight space that remains has cicatrized. At each change of gauze the parts should be washed off with 1 : 2000 solution of corrosive mercuric chlorid.

Stitched to abdominal wound.

Packed.

Dressing.

Removal.

Wound.

Fresh gauze.

External dressing.

Disinfection.

PART THIRTEEN.

LIPOMA, PAPILLOMA, AND VASCULAR GROWTHS AND TUMORS.

CHAPTER I.

LIPOMA.

Subcutaneous. Pelvic. Subperitoneal.

1. Fatty tumors are found in the subcutaneous connective tissue of the vulva or in that of the pelvis. Subperitoneal tumors originating in the fat of the omentum and region of the kidney occasionally attain a large size and descend to the pelvis.

Characteristics.

2. **Lipomata of the vulva** may grow to considerable dimensions and become pendulous or pediculated. They present the characteristics of fatty tumors elsewhere.

Fluctuation. Fibroids. Skin. Depression.

They give a slight sensation of fluctuation, as is the case of vulval fibroids, but are a little softer (more doughy). The overlying skin is intimately connected with the tumor, and presents depressions corresponding to those between the lobules of the tumor.

Removal.

The *treatment* consists in removing them by the knife and sewing together the edges of the skin over the raw surface.

Small size. Larger.

3. **Lipomata of the broad ligament** of small size have been observed a number of times, particularly under the Fallopian tube. Exceptionally they may grow large enough to be recognized by examination as a tumor.

Kidney region and omentum.

Subperitoneal lipomata of the kidney region or omentum that descend to the pelvis can not usually be differentiated from tumors of other kinds. They are more doughy and semi-fluctuant than fibroids, and are of slower growth, and produce less effect upon the general health than carcinoma or sarcoma arising from the same places.

Fibroids.
Carcinoma and sarcoma.

They should be removed as soon as discovered, since they may grow to a large size, and the operation become a very formidable one.

Removal.

CHAPTER II.

PAPILLOMA.

1. *Papillary growths* and *vegetations* are found on the vulva, in the vagina, in the Fallopian tube, and on the ovary.

Location.

2. **Papillomata or condylomata of the vulva and vagina** have been described in connection with gonorrheal inflammation.

Gonorrheal.

The *causes* in most cases are irritating discharges, due usually to venereal infection. The tendency to their development is increased by pregnancy. (See part VII, chap. XV, par. 3, 4, 7, and 25.)

Venereal discharges.
Pregnancy.

3. **Papilloma of the Fallopian Tubes.** Papillary growths have in only a few instances been found in the Fallopian tubes. They may fill the tube, perforate it, and infect the peritoneum. As in superficial papilloma of the ovary, there seems to be some doubt about their benignant nature. Venereal disease has been given as a cause (Sutton).

Rarity.
Development.
Malignancy.
Venereal disease.

The ordinary inflammatory vegetations of the tubal mucous membrane resemble papillomata somewhat in appearance, and should not be confounded with them.

Inflammatory.

The treatment is removal of the tube.

Removal.

4. **Papilloma of the Ovary.** Papillary growths may develop in ovarian cysts (part XII, chap. II) and from the surface of the ovary.

Two varieties.

Cauliflower mass. Infection of peritoneum, etc. When developed from the *surface* they occur as cauliflower masses growing upon the ovary, which infect the peritoneum and also the pelvic connective tissue, and, without attaining great size, may give rise to an induration of the pelvis that feels much like that of pyosalpinx to the examining finger. Like pyosalpinx. Spread. The vegetations may spread over the uterus and appear on the surface of all the surrounding viscera. Ascites. Some ascites is apt to be present.

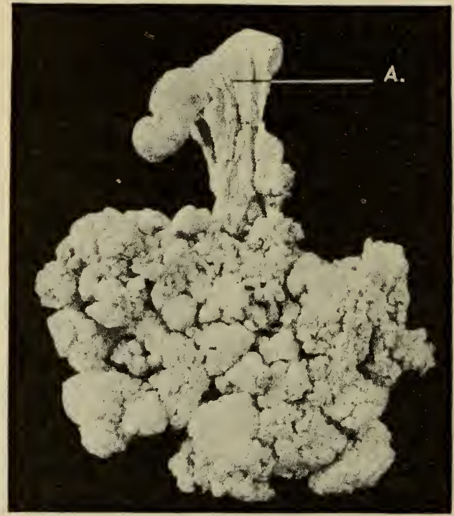


FIG. 330.—PAPILLOMA OF OVARY. (*Freeborn.*)
A. Fallopian tube.

Relation to carcinoma. They are usually associated with carcinoma, and there is some doubt as to whether they are not always secondary to it.

As carcinoma. The symptoms, diagnosis, and treatment are the same as of carcinoma of the ovary.

CHAPTER III.

VARICOSE VEINS, VASCULAR TUMORS, URETHRAL CARUNCLE, ANGIOMA OF THE UTERUS.

Location.

1. **Varicose veins** are found in the vulva and broad ligament.

Enlargement. Parts affected. Physical signs. Not sensitive. Burning, etc. Weight, bearing-down, etc.

Varicose veins of the vulva cause an enlargement which, during the pregnant state, may attain the size of a cocoanut. The principal enlargement is outside, although the varices may extend into the vagina. The veins may be seen as dark-blue, irregular-shaped masses, that collapse on pressure, but immediately refill when the pressure is removed. They are seldom sensitive to the touch, but are apt to be associated with disagreeable burning, aching, and itching sensations in the parts. A feeling of weight or bearing-down, and sometimes a frequent or constant desire to urinate, are felt.

Pressure. Straining, hard work, displacements. Age, emaciation, etc.

They are caused by pressure on the pelvic veins from the pregnant uterus, abdominal tumors, exudates, etc. Straining at stool, laborious occupations or displacements of the pelvic viscera, may cause them, but in such cases their effect may only become noticeable in advancing age, or following conditions of extreme emaciation or debility.

Rupture.

Rupture, with the formation of a large hematoma or even with external hemorrhage, occasionally occurs.

Lotions. Pad. Rest, etc. Stools. Ligature.

Astringent lotions, such as saturated aqueous solutions of tannin, sugar of lead, or alum, may be applied for temporary relief. A well-adjusted pad, supported by a T-bandage, may be worn with benefit. An abdominal bandage to support the pregnant uterus is sometimes helpful. The patient should lie down a portion of the time, avoid lifting and straining, and keep the bowels well regulated. Ligature of the veins should not ordinarily be attempted, since it is impossible to include the deeper ones.

Compression. Sutures.

Rupture with external hemorrhage should be treated by compression until preparations can be made for the introduction of sutures deep enough to include the bleeding vessels.

Hematoma.

Rupture with hematoma is described in part v, chap. I, par. 2.

Exclusion. Left side. Relaxed condition. Pain. Ovary.

2. **Dilation of the internal pelvic veins** can not usually be diagnosed except by exclusion. It occurs more often in the left broad ligament, and is preceded by a relaxed condition of the pelvic tissues, and a burning or dull aching pain extending upward from the inguinal canal of the affected side. The ovary is apt to be slightly enlarged and hangs rather low in the pelvis.

Pessaries. Operations. Reefs in ligament. For extreme cases.

The treatment consists in holding the uterus well up in the pelvis with an Albert Smith or Thomas retroflexion pessary, and, if retroversion exist, in Alexander's operation, or hysterorrhaphy. Reefs have been taken in the ligament (Kelly) when the condition was found during abdominal operations, but the impossibility of including all of the dilated veins, and the danger of wounding the blood-vessels or of including the ureter, would render the procedure justifiable in extreme cases only.

Location. Removal.

3. **Small vascular spots or tumors** are sometimes found on the vulva, in the vagina, or in the urethra. They are of but little importance and seldom give rise to trouble. They can be removed by cautery, electropuncture, or by excision and suture.

Definition. Usually single. Outside. Size.

4. **Urethral caruncle** is a vascular tumor growing from the mucous membrane of the urethra at or near the meatus. It is usually single, although sometimes several are found. One occasionally grows just outside of the urethra. They vary in size from a pin-head to a large grape.

They are composed of hyperplastic mucous membrane and an abundance of dilated capillaries. Some contain such an abundance of nerve-fibers that they have been called neuromata.

Structure.
Neuroma.

The chief *symptoms* are dysuria, dyspareunia, and sometimes retention of the urine.

Subjective.

They are bright red in color, round or oval in shape, usually extremely sensitive, and are easily made to bleed. They are either pediculated or sessile, and should not be mistaken for everted folds of urethral mucous membrane accompanying follicular or granular urethritis (part VII, chap. VI, par. 5).

Physical qualities.
Pediculated, etc.
Folds of membrane.

They may be removed by torsion of the pedicle and cautery of the base with nitric acid, or, if the base be large, by burning them off with the electrocautery or a wire heated over a lamp. A ten per cent. solution of cocain will usually benumb the parts sufficiently for the former procedure.

Torsion and cautery of base.
Electro- or thermo-cautery.
Cocain.

If the tumor originates high up in the urethra, the meatus should be dilated with sounds, a speculum be introduced, and the tumor cauterized or taken off with a snare.

High origin.

5. **Angioma** of the uterus has been observed in two forms, viz.: a more or less circumscribed, cavernous angioma (Klob, Boldt), and a diffuse vascularity of the uterine walls (Pichevin and Petit Qénu).

Two forms.

Cavernous angioma, which is an extremely rare affection, is a circumscribed tumor extending from the mucous membrane partly or entirely through the uterine wall, according to its size. It is soft in consistence unless hardened by local treatment. Upon section the mass presents a dark-red mottled appearance, from which blood exudes. Under the microscope it is seen to be composed mainly of dilated veins communicating with blood cavities and dilated capillaries. Replacement of muscular fibers by connective tissue, and of both by the vascular tissue, is apparent. The mucous membrane may be normal, or the seat of polypoid endometritis.

Rare.
Tumor.
Extent.
Consistence.
Section.
Microscopic appearance.
Replacement of muscle.
Mucous membrane.

Extended changes. Walls. Vessels, etc.

Diffuse angioma presents more extended but less pronounced changes of a similar nature. The uterine walls are thickened. The blood-vessels are greatly dilated, and the lymphatics and connective tissue about the vessels is abundant, while the muscular fibers are less numerous than normal. In places the stroma is almost entirely replaced by blood-vessels.

Stroma.

Subinvolution. Adherent placenta.

The condition is supposed to originate in connection with puerperal subinvolution. Adherent placenta has been given as a cause of the cavernous variety.

Chronic metritis. Curettage. Malignant disease.

The *symptoms* are those of chronic metritis, with persistent menorrhagia and sometimes metrorrhagia. The failure of repeated curettage and the absence of malignant disease are diagnostic.

Operation.

The *prognosis* is not ordinarily good, except in connection with operative interference.

Cautery.

Treatment. Cautery of the uterine cavity with a 50 per cent. solution of zinc chlorid every two weeks will sometimes relieve the hemorrhage and cause obliteration of some of the more superficial veins.

Excision of mucosa.

Quénu cured one case by incising the anterior and posterior walls of the uterus until the uterine cavity became accessible, and then excising the uterine mucous membrane.

Hysterectomy.

In extreme cases it may become necessary to remove the uterus.

PART FOURTEEN.

EXTRA-UTERINE PREGNANCY, PELVIC HEMATOCELE, AND PELVIC HEMATOMA.

CHAPTER I.

EXTRA-UTERINE PREGNANCY.

(*Ectopic Gestation. Tubal Pregnancy.*)

Condition. Place of attachment.

1. Under certain conditions the human ovum may become impregnated, form an attachment before it reaches the uterus, and go on developing outside of the uterine cavity, constituting *extra-uterine pregnancy* or *ectopic gestation.* The place of attachment may be the Fallopian tube, or epithelial surface of the infundibulo-ovarian ligament and ovarian fimbriæ, and possibly the germinal epithelium of the ovary.

Ovarian. Infundibulo-ovarian. Tubal.

The cases of pregnancy in the ovary are restricted to five or six, all more or less doubtful, and our knowledge of them is unsatisfactory. The attachment upon the infundibulo-ovarian ligament and ovarian fimbriæ has been observed in two authentic cases only,—those of Zweifel and A. Martin. The ordinary place of attachment is within the tube, and is called *tubal pregnancy.*

Three varieties.

There are three main varieties of tubal pregnancy, named according to the place of attachment of the ovum. When the ovum attaches itself in the outer end, or ampulla, of the tube, the pregnancy is called *ampullar;* when in the inner portion, or isthmus, it is called *isthmic;* when in that portion which traverses the uterine walls, it is called *interstitial.* The most common variety is the ampullar; the isthmic next.

Secondary varieties.

From these main varieties several secondary ones may be developed, viz.: *tubo-uterine*, *tubo-abdominal*, *tubo-ovarian*, *abdominal*, and *intraligamentous*, or extraperitoneal.

Decidua. Villosities of the chorion.

2. The epithelium disappears at the site of implantation of the ovum, and an imperfect decidua is formed. The villosities of the chorion attach themselves directly to the tubal walls,

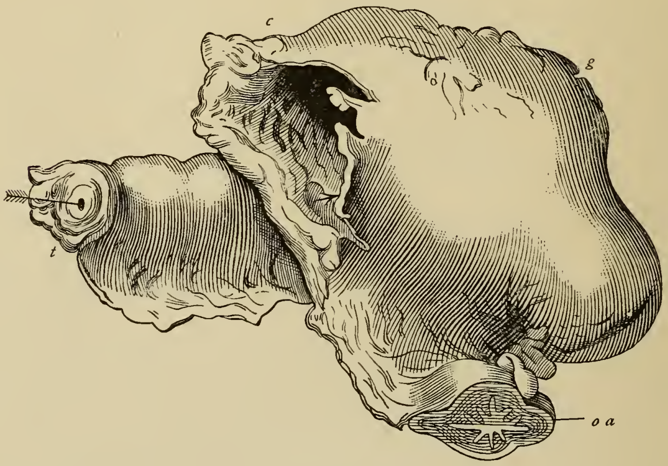


FIG. 331.—AMPULLAR PREGNANCY AT THE TENTH WEEK, SHOWING COMPLETE OCCLUSION OF THE OSTIUM.

t. Isthmus of tube. *g.* Gravid portion of tube. *c.* Cavity of chorion, seen through an artificial opening. *oa.* Ostium abdominale.

Hypertrophy and thinning of walls.

which, as the ovum develops, undergo hypertrophy. But, as the hypertrophy does not keep pace with the growth of the ovum, the tubal walls, about the third or fourth week, begin to stretch, and thus become progressively thinner. Between the fourth and eighth weeks the ovum may, if situated near the abdominal end, be expelled through it into the peritoneal

Tubal abortion.

cavity, constituting the so-called tubal abortion. Whether it is tubal contraction or the mechanical pressure of the effused

Causes of expulsion.

Hemorrhage.

Rupture

blood that causes its expulsion, is unknown. If the ostium abdominale becomes closed, or if the ovum is situated in the isthmus, hemorrhage usually takes place at the placental site between the third and twelfth weeks, separates the placenta and membranes from their attachments, and ruptures the tube at its weakest place, which is at or beside the placental attachment. The rupture is, as a rule, attended by the escape of the fetus and by hemorrhage.

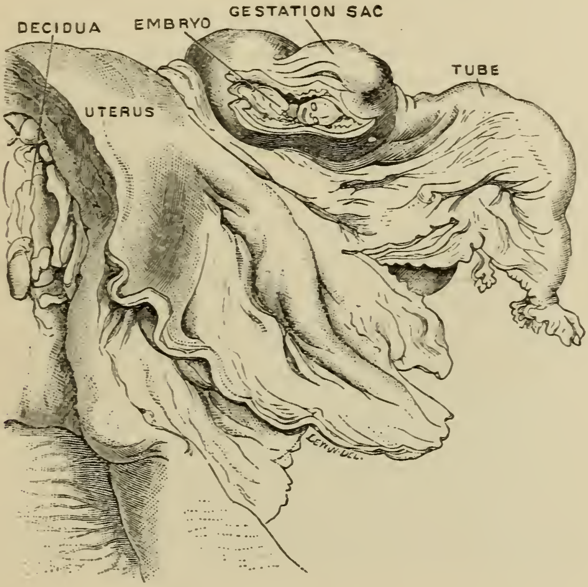


FIG. 332.—ISTHMIC PREGNANCY. THE GESTATION SAC RUPTURED AND CAUSED DEATH IN FORTY-EIGHT HOURS. (*Museum, St. George's Hospital. Bland Sutton.*)

Into peritoneal cavity.

Into mesosalpinx.

If the rupture is into the free peritoneal cavity, there is apt to be one or more copious hemorrhages into the peritoneal cavity. If there be pelvic adhesions, a pelvic hematocele is liable to form. Tubal abortion produces similar hemorrhage through the ostium abdominale. If rupture into the mesosalpinx takes place, a subperitoneal hematoma is the ordinary result.

Apoplectic ovum.

Hemorrhage into the chorion may produce an apoplectic ovum, or mole, that may remain in the tube after the escape of the fetus and hemorrhage through the ruptured tubal walls or patent ostium abdominale has taken place (Fig. 334), or may escape into the abdominal cavity (Fig. 333), or into the broad ligament. An apoplectic ovum is rounded or ovoid, and varies in size up to that of a large egg, and is made up of blood clots containing chorionic villi, the remains of the fetal sac, and, in rare instances, the ovum itself.

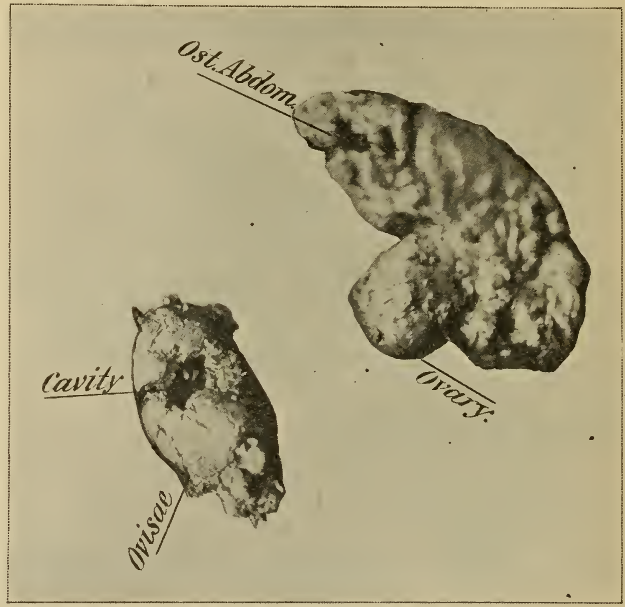


Fig. 333.—Apoplectic Ovum, or Tubal Mole, and Tube after Tubal Abortion at Eight Weeks. (*Author's case.*)
The tube and the ostium abdominale, through which the ovisac escaped, have contracted.

Description.

In uterine wall.

When the ovum develops in that portion of the tube passing through the uterine wall (interstitial), the uterine cornu, Hypertrophy. Rupture. Hemorrhage. Death before rupture. Uterine cavity.

and, to a certain extent, the whole uterus, becomes hypertrophied, and forms part of the sac, and the rupture may not take place until the twentieth week. In such cases the hemorrhage proves rapidly fatal. In other instances the ovum perishes before the time for rupture, and becomes infected from the uterine cavity. Sometimes the ovum is situated so near the uterine opening that it develops in part within the uterine cavity (tubo-uterine). Exceptionally, it passes into the uterus and goes on developing as in normal pregnancy.

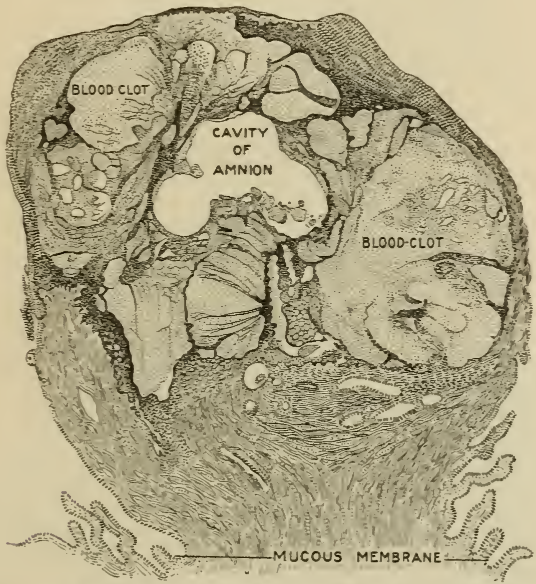


FIG. 334.—A TUBAL MOLE IN SECTION, UNDER LOW MAGNIFICATION. HERE AND THERE CHORIONIC VILLI ARE SEEN IN SECTION. (*Bland Sutton.*)
It is attached to the mucous membrane.

On fimbriæ, etc. Placenta. Ovum. Rupture.

When developed on the fimbriæ of the tube, or the infundibulo-ovarian ligament, the placenta rapidly covers both the ovary and fimbriæ, and the ovum develops either in a sac formed partly by the tube and the ovary (tubo-ovarian), which ruptures as in the tubal variety, or it loses its placental con-

To full term. nection with the fimbriæ, and develops to full term in an adventitious sac of connective tissue in the free abdominal cavity (abdominal); or else it develops between a fold of peritoneum and the ovary. Ovarian tissue. In the latter case the ovarian tissue may become a part of, or nearly all of, the sac; or, on the other hand, the ovarian tissue be all absorbed. When the ostium abdominale is attached to the ovary, or if a tubo-ovarian cyst exists, the sac is composed of both ovary and tube (tubo-ovarian). Tubo-ovarian. Rare forms. As a *rara avis* it is said to develop in the ovary itself (ovarian), or in an accessory tube or ostium.

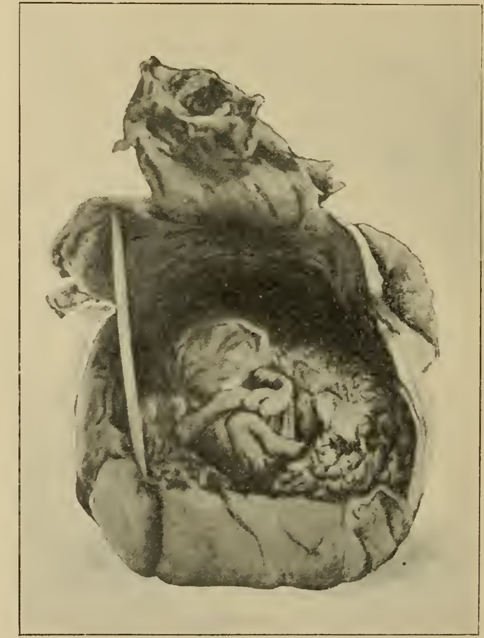


FIG. 335.—FETUS OF ABOUT THREE-MONTHS' DEVELOPMENT, SURROUNDED BY BLOOD CLOTS AND INCLOSED IN AN ADVENTITIOUS SAC. REMOVED FROM THE ABDOMINAL CAVITY. (*Case of Dr. F. Dickenson.*)

A hemorrhage into the tube during the first few weeks may destroy the ovum and result in a hematosalpinx, which may become infected and transformed into a pyosalpin

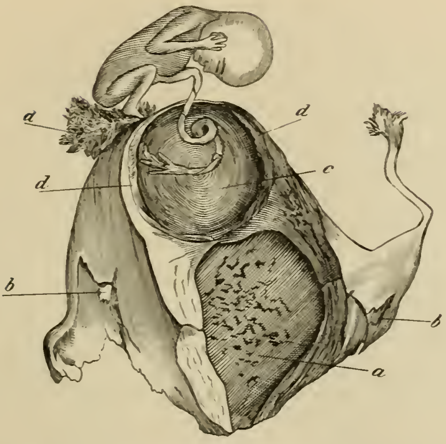


FIG. 336.—INTERSTITIAL PREGNANCY. (*Poppel.*)
a. Uterine cavity. *b*, *b*. Round ligament. *c*. Gestation sac. *d*, *d*, *d*. Chorion.

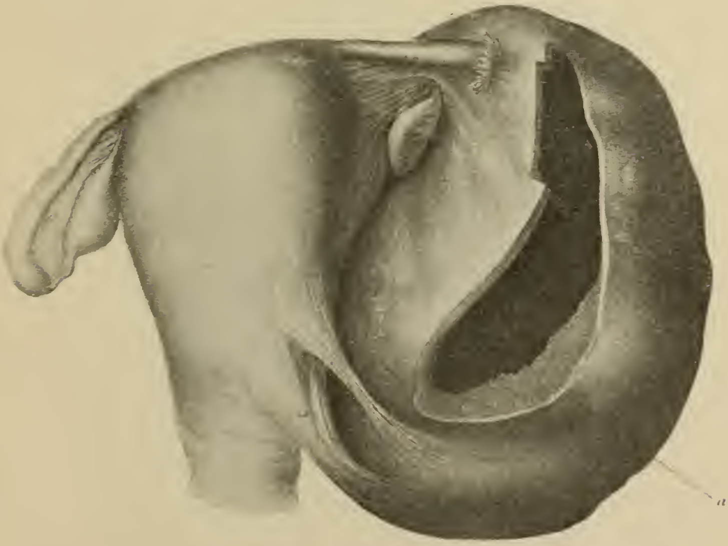


FIG. 337.—EXTRA-UTERINE PREGNANCY IN FIFTH MONTH. (SO-CALLED ABDOMINAL.)
⅓ SIZE. (*Zweifel.*)

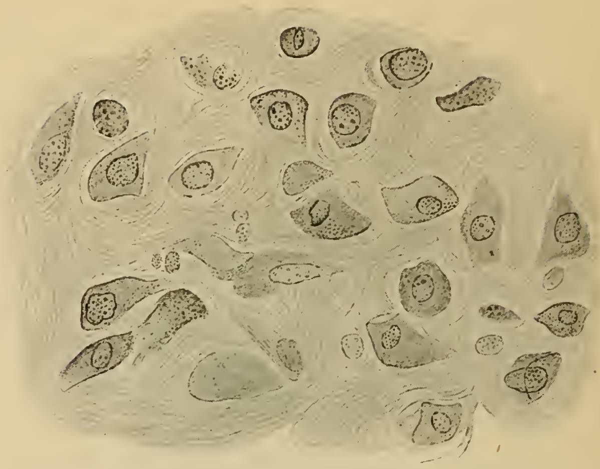


Fig. 338.—Section of Wall of Sac of Fig. 337. (*Zweifel.*) × 5.
Showing chorionic villi, wavy connective tissue, parietal peritoneum, retroperitoneal fatty tissue and decidual cells.

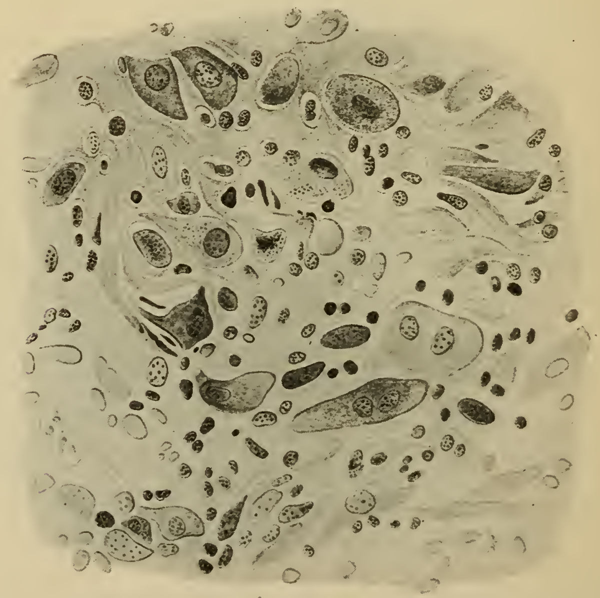


Fig. 339.—Decidual Cells from *a* in Fig. 337. (*Zweifel.*) × 435.

Uterine decidua.

3. The *uterus* undergoes evolution similar to that of the first two months of normal pregnancy, and a decidua three to six mm. (⅛ to ¼ of an inch) thick forms, which does not much resemble the uterine mucosa in structure, and which may be expelled piecemeal or entire from the uterus. The nearer the ovum is to the uterus, the greater are the changes in the uterus.

The uterine decidua differs from a normal decidua in that its inner surface shows no evidence of the attachment of the ovum. Its outer surface, however, has chorionic villi, and thus differs from the membrane expelled in cases of membranous dysmenorrhea. The latter is only two to three mm. ($\frac{1}{12}$ to ⅛ of an inch) thick.

Abel asserts that the decidua of extra-uterine pregnancy when expelled does not carry any glandular tissue with it, while the decidua of abortion always contains portions of fetal membrane or of the glandular tissue. Curettage would, of course, always bring glandular tissue, and hence pieces removed by the currette can not be used for the purpose of making this distinction.

Placenta.

To full term.

Ostium abdominale.

4. After *rupture* of the tube into the *peritoneal cavity*, if the placenta has not been separated to a great extent, and if the membranes do not rupture, the placenta may spread out over the peritoneal surface, or grow up in the shape of a high, fleshy mass, and the fetus go to term in the abdominal cavity (abdominal), and perish during an attack of spurious labor. It sometimes happens that the ovum protrudes partly through the ostium abdominale (tubo-abdominal) or is expelled through it (abdominal); and it is supposed that it may go on developing there.

Hematoma.

Survival of fetus.

Full term.

Secondary rupture.

When rupture of the tube into the *broad ligament* takes place, a hematoma may form with the death of the fetus; or the rupture may be small and gradually enlarge without destroying the fetus, and the tube become a part of the cavity. (Bland Sutton.) The ovum may, in the latter case, develop to full term in the broad ligament (intraligamentous), or it may rupture secondarily through the broad ligament fold into the peritoneal cavity and develop there (secondary abdominal).

Placenta spread over sac.

The placenta may spread out from the tube, and be lifted up by the fetus growing in the broad ligament so as to form a thin layer of placental tissue over the sac, or it may develop in the broad ligament as a thick, well-formed placenta under the fetus.

In broad ligament.

In many of these cases that go on to term, or near it, the tube presumably develops into the broad ligament, where it may undergo hypertrophy and remain intact; or its walls may become atrophic from pressure and disappear, leaving the fetal sac covered only by the peritoneal folds of the ligament (Schuchardt).

When the fetus is developed in the broad ligament the anterior fold is, in the later months, lifted up and peeled off the abdominal wall for a short distance. The rectum or cecum, one or the other, is apt to be stripped of its peritoneum to a variable extent, the sac adhering to the denuded intestinal walls. Extensive adhesions of the sac to the surrounding viscera are usually found in the later months in all varieties.

The fetus is usually poorly developed or deformed, and seldom lives more than a few days even when removed at or near full term.

Twin pregnancy may occur in which one fetus is in the uterus, or in which both are in one tube, or one in each tube, or two in each tube. A tubal pregnancy may take place subsequent to one on the opposite side, or intra-uterine pregnancy may follow the tubal conception. The author has removed a small lithopedion with a ruptured tube from each side at one operation. Coe reported a case in which the patient conceived twice in the same tube.

Chronic pelvic peritonitis, with adhesions, collections of serum, pus, and blood clots, vesicular mole, carcinoma of the chorion, and other complications, have been observed.

5. After *spurious labor* the fetus perishes and undergoes mummification or septic changes.

Mummification.

A mummified fetus may be merely dried up by absorption of the soft parts, or it may undergo partial transformation into adipocere (a union of a fatty acid with ammonia), or the superficial tissues may be impregnated with lime salts, producing partial calcification (lithopedion).

Adipocere.

Calcification.

As the sac is usually adherent to an intestine, its contents may become infected and undergo decomposition and suppuration, and ulcerate into the rectum or upper intestines, vagina, bladder, or through the skin. Infection may also reach the sac by way of the uterus and Fallopian tube.

Infection of sac from intestines.
Ulceration into viscera.
Infection from tube.

After rupture of the tube and formation of a hematocele in the earlier months, absorption or suppuration may occur (chap. II). Or chronic pelvic peritonitis, with displacements and adhesions of the uterus and appendages, and more or less plastic exudate, or bloody or serous effusion, around the remains of the fetus, may persist for years.

Results.
Absorption or suppuration.
Chronic inflammation, etc.

6. **Etiology.** The causes of ectopic gestation are such as prevent or retard the passage of the ovum to the uterus, viz.: adhesions of the tube that determine a malposition, sharp bend, or tortuous course; an imperfectly developed or corkscrew-shaped tube (Fig. 85); atresia, or an obstruction within the tube, such as a polypus, torsion, etc. Since ciliated epithelium has been found about the insertion of the placenta (Bland Sutton, Hofmeier, Webster, Martin), it is probable that the ovum is implanted upon the intact mucous membrane. J. Clarence Webster asserts that the genetic influence that produces decidual changes within the uterus may exceptionally produce similar changes within the tube. That such a change may be produced by an irritation proceeding from the ovary, or by an inflammation in the tube similar to exfoliative metritis, is the most probable theory.

Arrest of ovum.
Changes in tube.
Intact mucous membrane.
Genetic influence.

The cause of the *rupture* or *abortion* is hemorrhage between the fetal membranes and the tubal walls, commencing at the placental attachment. It is due to the growth of the fetus and want of support of the newly formed vessels of the serotina. The immediate exciting cause is apt to be increased abdominal pressure (Webster) from physical exertion of the patient, coitus, intestinal peristalsis, rough examinations, etc. Adhesions and irregularities in the tubal walls predispose to rupture.

Hemorrhage.
Cause of hemorrhage.
Abdominal pressure.
Trauma.
Predisposing.

The possibility has been suggested of disease of the impregnated ovum, such as changes in adherent cells of the membrana granulosa (Kossman), or on the outside surface of the chorion (M. Hofmeier), which would enable the ovum to attach itself to the tubal mucous membrane.

Salpingitis.
After period of sterility.

7. **Symptoms.** The accident occurs more often in patients with a history of salpingitis, or in those who have not borne children for several years.

Normal pregnancy.

In many cases some of the symptoms of normal pregnancy are noticed, such as nausea, changes in the breasts, enlargement of the uterus, and the characteristic softening and venous discoloration of the cervix.

Irregularity of menstruation.
Intramenstrual hemorrhage.
Suppression.

The menses are usually delayed a week or ten days; then a uterine hemorrhage appears, which is less in amount than the normal menses, followed in a week or two by another bloody flow, and at variable intervals by others. In many instances there is a slight bloody discharge most of the time. In others they are entirely suppressed.

Colicky pain.
Like abortion.

Paroxysms of intense colicky pain across the lower abdomen sometimes precede these hemorrhages, and the patient is apt to think that she is having an ordinary abortion. The pains are due to distention of the tube by the blood effused into it. Some of it may find its way into the uterus.

No symptoms.
Salpingitis.
Subsequent inflammation.

Occasionally tubal pregnancy will go on until rupture without producing any noticeable symptoms. At other times the symptoms of salpingitis will complicate those of the pregnancy, or those of sactosalpinx will simulate them, or the fetus may die *in situ*, and give rise to the symptoms of inflammation without ever having presented those of the pregnancy.

Pain, shock, etc.
Sinking spells.
Peritoneal irritation, etc.

8. *Rupture* is usually heralded by an unusually severe attack of pain, and is followed by the symptoms of internal hemorrhage, viz.: shock, a feeble, rapid pulse, nausea, etc. The patient may die in collapse, or may react and, in a few hours or days, have another "sinking spell," and later others; or she will present mild symptoms of peritoneal irritation, and

recover with an intraperitoneal hematocele, or a hematoma of the broad ligament, which may become absorbed or be converted into an abscess, with pain, fluctuating temperature, etc. In other cases the effusion of blood, although accompanied by pain and shock, may be moderate, and the subsequent condition one of prolonged invalidism, due to the persistence of chronic pelvic inflammation about the dead fetus.

Prolonged invalidism.

Expulsion of the decidua usually but not invariably indicates that rupture of the tube or death of the fetus has taken place.

9. The symptoms after rupture, should the fetus survive, are those of pregnancy, and some tenderness and pain in the pelvis and iliac region.

Of pregnancy.
Tenderness and pain.

Death at full term (spurious labor) is usually attended by pains simulating those of labor, painful motions of the fetus, and sometimes hemorrhage and symptoms of collapse. The subsequent symptoms are apt to be the same as those of death in utero, viz.: chills, vomiting, bad taste, shrinking of the breasts, etc. (Martin). Later on the retained fetus may give rise to scarcely any symptoms, or its presence may interfere somewhat with the functions of the viscera. If the fetal sac becomes infected, the symptoms of septic absorption, inflammation in the surrounding viscera, discharges of pus and fetal bones through the perforated bladder, intestine, vagina, uterus, rectum, stomach, or umbilicus, will follow, and sometimes last for months or years, greatly reducing the patient in strength and sometimes resulting in her death.

Labor pains, motions, etc.
Death in utero.
Scarcely any.
Surrounding inflammation.
Discharge of fetal bones
May last for years.

10. The **physical signs** before rupture are the changes in the uterus that belong to normal pregnancy, a slight enlargement and tenderness of the Fallopian tube, and some restriction in the mobility of the uterus. The enlarged tube is usually soft, and round or pear-shaped, and hangs over the sacro-uterine ligament in the culdesac of Douglas. Pulsating vessels can sometimes be felt under it.

Normal pregnancy.
Enlarged tube.
Mobility of uterus.
Changes in tube.

Less definite. Fornices. Abdomen. Temperature.

After rupture into the abdominal cavity the tumor will not be as well defined. There is then a doughy fullness, and tenderness behind and beside the cervix, and also slight abdominal tenderness and distention. There is increased resonance over the upper abdomen and moderate dullness below. The temperature rises two or three degrees above normal, but usually subsides within a day or two.

Hematocele. Masses in abdomen.

If the patient survive the attack, a retro-uterine hematocele may be felt after a few days by vaginal indagation, or irregular, hard, slightly resonant masses be felt in the abdominal cavity.

Hematoma.

After rupture into the broad ligament the physical signs of hematoma of the broad ligament present themselves (chap. 11).

Abdominal tumor. Fetal parts. Uterus.

If the fetus continues to grow, whether in the broad ligament or in the free abdominal cavity, the abdomen becomes enlarged by a tumor somewhat laterally situated, and the fetal parts can be distinguished with greater ease than in normal pregnancy, either by abdominal palpation or by a rectovaginal digital examination. The uterus is usually pressed up behind the pubes.

Physical signs with symptoms. When impossible. Uterus too small. Colicky pains, etc.

11. The **diagnosis** is not always difficult when the physical signs are considered carefully in connection with the symptoms, yet it may be impossible before rupture, on account of a lack of characteristic symptoms. If there be symptoms of pregnancy, and the uterus be found too small for the supposed period of gestation, the signs of extra-uterine pregnancy should be sought for. Irregular menstruation, colicky pains in the lower abdomen, and signs of internal hemorrhage or hematocele should always lead one to suspect this accident.

Tenderness. Fundus. Sound. Direction.

From *retroversion* of a *gravid uterus* it is known by the tenderness of the retrocervical mass, and the digital or bimanual discovery of the fundus over or in front of the cervix, or by the passage of the sound upward toward the abdominal cavity. The sound may be gently passed upward and forward, for there can be no danger of its entering the cavity of the supposed retroverted uterus so long as the end is not allowed to go backward.

In many instances we can not distinguish the gravid tube from *cystic salpingitis* or *pelvic tumors*, but a careful consideration of the history, signs, and symptoms will often clear up the diagnosis. The expulsion of the decidua is positive proof if intra-uterine pregnancy can be eliminated, or if the absence of the decidua reflexa can be demonstrated (par. 3).

History, etc.

Decidua.

In *normal pregnancy* the uterine body is more globular, and the discovery of the enlarged tube would make the presence of a fetus in utero improbable, although not impossible.

Shape of uterus. Enlarged tube.

In interstitial pregnancy the opposite side of the uterus is undeveloped and the laterally displaced cornua assumes a vertical direction (C. Ruge). The round ligament arises on the outer side of the mass instead of on the median side, as in other forms of ectopic gestation.

Shape of uterus.

Round ligament.

The diagnosis after operation is made by finding the fetal parts or chorionic villi on the remains of the sac.

Chorionic villi.

The fetal sac at the beginning of the second month is about the size of a pigeon's egg; at the end of the second month it is the size of a walnut; at two and one-half months, the size of a hen's egg; at three months, the size of a fist; at four months, the size of two fists (von Ott).

The rupture of a pyosalpinx may be mistaken for that of a pregnant tube. The following table, taken from the "American Text-book of Gynecology," places the symptoms of each in juxtaposition:

RUPTURED ECTOPIC GESTATION.	RUPTURED PYOSALPINX.
Frequency of pulse greater.	Frequency of pulse less.
Temperature at first subnormal; later, rises slightly.	Temperature rises steadily and markedly.
Pain of shorter duration.	Pain of longer duration.
Patient shows loss of blood.	Patient does not show loss of blood.
Septic symptoms not usually present.	Patient soon shows signs of sepsis.

Unfavorable.

12. The **prognosis** without interference is unfavorable, both for the mother and the fetus. If a diagnosis is made before tubal rupture, the danger to the mother may be considered much greater without than with a well-performed peritoneal section. Intraperitoneal rupture is often fatal from hemorrhage, and the danger from peritonitis and pelvic hematocele with septic complications is considerable if the patient survives. Extraperitoneal rupture seldom causes death by hemorrhage, but endangers the life from subsequent septic changes or continued development of the fetus.

Peritoneal section.

Intraperitoneal rupture.

Extra peritoneal rupture.

Stage.

13. **Treatment.** The treatment will be considered as adapted to the stage before, at the time of, and after abortion or rupture.

Before tubal rupture or abortion the best treatment consists in a removal of the tube and ovary by abdominal section or by anterior colpotomy (Duehrssen, Kossman). The latter procedure is not advisable after the mass has become larger than a goose egg. In case the other tube is diseased, the affected tissues may with advantage be removed in connection with vaginal hysterectomy (Krug). A. Martin, meeting with an apparently healthy pregnant tube, incised it longitudinally over the place of attachment of the ovum, removed the latter, and sutured the incision.

Abdominal section.

Anterior colpotomy.

Size.

Hysterectomy.

Danger less with operation.

When the diagnosis is made the danger of rupture is already imminent, and any less radical method than removal would be to court greater dangers than that of a peritoneal section by a skilful operator.

When the diagnosis, however, can be made before the end of the sixth week, the fetus may be destroyed by a galvanic current as strong as can be borne, and passed from a vaginal or rectal electrode to a large external electrode placed a little above Poupart's ligament; but preparations should immediately be made for an abdominal section, to be performed upon the supervention of internal hemorrhage or of the colicky pains that so often precede the abortion or rupture.

Hypodermic injections of morphin into the fetal sac are an efficient feticide, but are liable in unskilful hands to produce hemorrhage or sepsis, and, therefore, are not as safe as electricity nor as a properly performed abdominal section. From one to two centigrams ($\frac{1}{6}$ to $\frac{1}{4}$ gr.) may be given, and be repeated once or twice at intervals of four or six hours.

14. *At the time of rupture or abortion*, with symptoms of a serious hemorrhage and without the signs of an accumulation in the broad ligament, an ice-bag should be put on the lower abdomen, and the abdomen opened as soon as preparations can be made. If the hemorrhage has ceased, a few hours' watchful delay, until reaction has taken place, is permissible.

Ice-bag
Operation.
Reaction.

When the blood is extravasated in the broad ligament, or when a well-defined intraperitoneal hematocele has formed, an ice-bag should be kept on the lower abdomen for forty-eight hours, and the patient be closely watched and as nearly as possible immobilized for three or four days, *i. e.*, not allowed to raise her shoulders from the bed, nor to turn over without assistance. After that she should lie in bed for two weeks, or until absorption of some of the blood, as indicated by shrinking and hardening of the mass, is demonstrated by vaginal examination.

Ice-bag.
Immobilizing of patient.
Subsequent rest in bed.

In case the first intraperitoneal hemorrhage is slight and the conditions for an operation are unfavorable, this treatment may be employed, and preparation be made to operate upon the recurrence of hemorrhage. If a hematocele forms in the culdesac, the immediate danger is much lessened.

Before making the incision the patient's abdomen should be scrubbed with alcohol and ether and with a 1 : 2000 corrosive mercuric chlorid solution. The first thing to do after opening the abdomen is either to ligate or put hemostatic forceps on the pedicle, or on the uterine and ovarian arteries, in order to check the hemorrhages. Adhesions that interfere with this should be rapidly broken up. The blood may then be sponged out, and the pelvic cavity, if filled with clots, be flushed with a $\frac{6}{10}$ of one per cent. solution of chlorid of sodium in sterilized water. Drainage will not be necessary if the bleeding vessels have all been secured. An enema composed of 1000 gm., or one quart, of the saline solution with 60 gm., or two ounces, of brandy may be thrown into the colon before the patient is put to bed. In case the collapsed condition of the patient calls for a rapid completion of the operation, the clots may be left undisturbed and the abdomen closed without drainage.

Procownick operated upon a case eighteen hours after rupture, removed the products of conception, and sutured the rupture in the tube, thus saving an only remaining tube. The patient subsequently bore a living child.

To end of fourth month.

Fourth to eighth.

After eighth.

15. *After rupture* with continued growth of the fetus, it is comparatively safe to remove it up to the end of the fourth month. Between the fourth and the eighth month the fetus should be destroyed by electricity or morphin injections, and an operation be postponed for two months to allow the placenta to atrophy, unless the symptoms call for its removal sooner. After the beginning of the eighth month an endeavor should be made to deliver a living child at or near the beginning of the ninth month, thus giving the child a chance without adding much to the dangers of the mother.

The child has almost as good a chance to live if born three or four weeks before term as at term, because the limited space and imperfect placenta prevent its thriving well after that, while the continued growth of the placenta would render the operation more dangerous.

Wait.

Sepsis.

16. After spurious labor and death of the child, it is better to wait two months for the placenta to lose its vitality before operating, unless symptoms of sepsis should supervene, when the child should be removed.

Fenger has shown that sepsis and ulceration may take place without at first giving any decided warning, hence the case should be carefully watched.

The steps of the removal are about as follows: A short abdominal incision laterally over or just below the most prominent part of the tumor. Examination of the sac and prolongation of the incision, in the endeavor, if possible, to avoid the placenta. In case the peritoneal cavity has been entered, and the fetus is dead, the peritoneal edges should be temporarily stitched to the parietal edges in order to prevent infection of the peritoneal cavity. Then the sac is incised, the bleeding edges clamped, the fetus carefully delivered, the umbilical cord cut between two pairs of forceps and tied near the placenta, which is not disturbed. If, however, the fetus has been dead for two months or more, the edges of the placenta are carefully separated. If but little bloody oozing results, it may be peeled off, and the sac be tamponed with gauze. If the placenta can not be safely removed, the sac is sewed up, the field of the operation disinfected, the temporary peritoneal sutures removed, and an attempt at enucleation of the sac is made, beginning at the placental site, leaving shreds on the intestines or vascular areas, and ligating and suturing other bleeding places. The uterine and ovarian arteries are always to be ligatured if they can be found (Olshausen). If the hemorrhage is profuse, the aorta may be compressed between the thumb and finger of an assistant while the operator is attending to the bleeding surfaces (von Herff). Catgut ligatures placed around the edges of the placental site (A. Martin) or around oozing surfaces will sometimes check the hemorrhage. If necessary, the bleeding area may be tamponed with strips of iodoform gauze brought out at the lower end of the abdominal wound.

If this can not be done, or if the surgeon has had but little experience in abdominal surgery, the sac may be stitched into the abdominal wound, and kept open until the placenta disintegrates and comes away in pieces. The process is tedious, and fraught with considerable danger from sepsis. The placenta can be mummified by being covered with benzoate of sodium (Werth). After the discharge becomes purulent or offensive, the gauze should be removed and the cavity be washed out three times daily with an antiseptic solution, such as a one per cent. solution of carbolic acid, twice daily, and 1 : 3000 corrosive mercuric chlorid (followed by sterilized water) once daily. A large rubber tube should be kept in the opening for drainage. Same instruments as for ovariotomy.

When the sac can not be made to reach the abdominal walls, it may be sewed over the placenta and drained through an artificial opening made into the vagina (A. Martin). Under antiseptic conditions the placenta has been left in the abdominal cavity to become absorbed (Tait, Negri).

Vaginal incision, or elytrotomy, consists in making an incision in the vaginal walls over the presenting part, and enlarging it by tearing. The fetus is removed with the forceps if the head presents; otherwise, by turning. The placenta is not disturbed. If hemorrhage take place, a quart or more of a 20 per cent. solution of ferric perchlorid in water may be injected and allowed to flow out, and then the contracted sac be carefully tamponed with strips of iodoform gauze. If the hemorrhage can not be checked, the abdomen should be opened and the ovarian and uterine vessels be ligated, or the sac be nucleated, or tamponed with iodoform gauze, as may be found practicable or necessary. The vaginal method is not to be recommended unless the fetus has been dead at least a month, for the danger of hemorrhage has proven to be great, and the means for its arrest are apt to be inadequate. It should never be done unless the fetal parts form a prominent tumor in the posterior wall of the vagina (Fenger).

If uncontrollable hemorrhage occur, it may be necessary to remove the uterus, or even to open the abdomen, in order to bring the bleeding tissues within reach.

After suppuration has taken place, operation by vaginali ncision is preferable. When, however, such is not practicable, and the sac can not be reached except by an abdominal incision which exposes the peritoneal cavity, the sac should be sutured to the edges of the wound and opened three or four days later, at which time the peritoneal cavity will be shut off by adhesions.

Removal through opening formed.

17. After a mummified fetus has disintegrated and begun to discharge through one of the viscera, or through the skin, the process should be favored by enlarging the opening and taking away the parts as they present. The cavity should be cleansed by antiseptic irrigations. Even when the parts are being discharged into the bladder, the urethra may be dilated, the parts removed, and the cavity and bladder be irrigated with a saturated solution of boracic acid. Strong antiseptics should never be injected, either by way of the bladder or rectum.

Irrigations.

Bladder

Strong antiseptics.

18. **Pregnancy in a Rudimentary Uterine Horn.** The fecundated ovum finds lodgment in a rudimentary uterine horn much more rarely than in the Fallopian tube, less than fifty of such cases having been so far reported.

Rarity.

The mode of impregnation may be by passage of the spermatozoa through the cervical opening of the rudimentary horn, or, if that opening be impervious, as is apt to be the case, it is by migration of the fecundated ovum from the opposite side. When the cervical opening is pervious and the corresponding ovary rudimentary, the ovum may migrate from the opposite side and become fecundated in the rudimentary side. The corpus luteum of pregnancy has been found on the opposite side in a number of instances.

19. When the impregnated uterine horn is small, but not,

strictly speaking, rudimentary, the pregnancy may go on to six or more months, and then rupture into the abdominal cavity, or it may go to term, with death of the fetus, and be followed later by the supervention of sepsis or the formation of a lithopedion. In such cases a normal, or approximately normal, decidua and placenta are present.

Rupture at six months. Death at term. Sepsis. Lithopedion. Decidua and placenta.

In proportion, however, as the impregnated horn is small and rudimentary, the changes that occur resemble those of tubal pregnancy, and the clinical history follows the same rule.

Resemblance to tubal pregnancy.

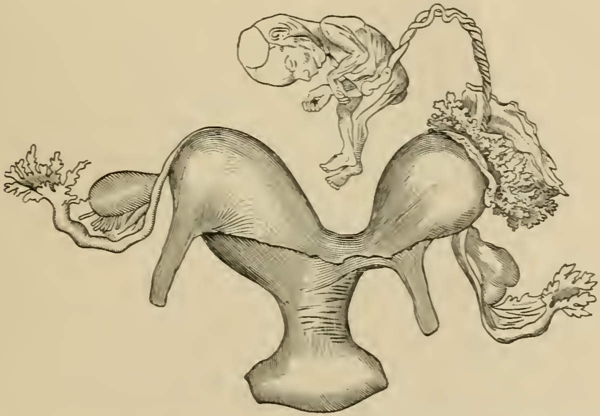


Fig. 340.—Pregnancy in a Left Rudimentary Uterine Horn—Front View. (*Heyfelder-Kussmaul.*)
Rupture in the fourteenth week.

20. The *diagnosis* from tubal pregnancy is based upon the discovery by the bimanual palpation of the attachment of the impregnated horn to the uterus in the neighborhood of the internal os, and of the round ligament to the outer side of the mass.

Attachment of horn. Round ligament.

If the impregnated horn resembles more an imperfectly developed side of a septate uterus, without a pronounced sulcus between the cornua, it may be impossible to differentiate it clinically from interstitial pregnancy.

Difficulty.

Amputation.
Safety.

21. The *treatment* consists in amputation of the sac. As the placenta is usually situated in the sac, the removal of the sac and the entire products of conception is ordinarily much safer than in cases of advanced tubal pregnancy.

CHAPTER II.

PELVIC HEMATOCELE AND PELVIC HEMATOMA.

Definition.

1. By *pelvic hematocele* we understand an effusion of blood into the pelvic peritoneal cavity ; by *pelvic hematoma*, an effusion of blood into the pelvic connective tissue (Tait).

Uterus and intestines.
Fill pelvis.
When in front of uterus.

2. **Pathological Anatomy.** In *pelvic hematocele* the effusion usually pushes the uterus forward and the intestines upward, and may partly or completely fill the pelvis. When the uterus is adherent in the back part of the pelvis, the blood may be found in front of it.

Subperitoneal.
In broad ligaments.
In sacro-uterine.
Displaces cervix.
In front of cervix.
Compression.

In *pelvic hematoma* the effusion is into the subperitoneal connective tissue, and, if small, occupies a portion of one of the broad ligaments. If large it usually passes posteriorly across the median line and into the sacro-uterine ligaments, and pushes the cervix upward, over, and a trifle to one side of the symphysis pubis. Exceptionally, it passes across in front of the cervix. The rectum, and sometimes the ureters, are compressed.

Coagulation.
Encysted.
Results.
Offensive pus.

The effused blood in either case undergoes coagulation into a dense corrugated mass, or becomes encysted as a tarry fluid. It may undergo absorption, or remain encysted for an indefinite period, or be transformed into pus. The pus found in a hematoma is usually offensive, from the invasion of intestinal germs.

The changes in the pelvic organs are those that have caused the hemorrhage (par. 3).

3. **Etiology.** The most frequent causes are the rupture or abortion of a gravid Fallopian tube, and operations involving puncture of veins, imperfect ligation of vessels, or the separation of adhesions. Among occasional causes may be mentioned: Abortions in connection with peritoneal adhesions, particularly if followed by curettage; rupture of varicose veins of the broad ligament, or of a hematosalpinx or ovarian hematoma; hemorrhage into the diseased tube during menstruation, particularly during attempts at menstruation in cases of atresia of the cervix or vagina; the rapid evacuation of the uterus for hematometra; malignant disease of the tube.

Ectopic gestation.
Operations.
Abortions with adhesions.
Rupture of veins, etc.
Hemorrhage into tube.
Hematometra.
Malignant disease.

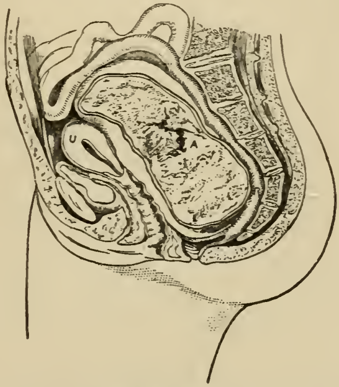


FIG. 341.—RETRO-UTERINE HEMATOCELE. (*R. Barnes.*)
U. Uterus. *R.* Rectum. *A.* Blood-cot.

4. **Symptoms.** The symptoms in the majority of cases are those of the extra-uterine pregnancy upon which it depends. In other cases the first symptom is a sharp pain in the lower abdomen, followed by faintness, nausea, depression of temperature, and occasionally by syncope. After a few hours reaction takes place, with slight elevation of temperature, and, if the effusion be in the peritoneal cavity, with some tympanitic distention of the lower abdomen. The pains subside rapidly if the patient remains in bed, but return, sometimes

Of extra-uterine pregnancy.
Pain, etc.
Reaction.
Subsidence and recurrence.

accompanied by a recurrence of hemorrhage, if she gets up within twenty-four hours, as she usually wishes to do.

Pressure.
Tenderness, etc.

Symptoms due to pressure soon manifest themselves, such as obstinate constipation, sometimes dysuria and painful defecation, and even symptoms of rectitis. Iliac tenderness with neuralgic radiating pains may be present, but pain is seldom a prominent symptom.

Menses.

The menses are apt to be prolonged, and unusual exertions sometimes bring on a slight intermenstrual bloody flow.

Hardening of soft mass.

5. **Physical Signs.** It is often possible to distinguish a soft mass, increasing in hardness day by day, by deep pressure over the pelvis.

Per vaginam.
Bimanually.

Hematocele, as felt per vaginam, presents a soft, somewhat elastic, rounded tumor in the recto-uterine pouch behind the uterus, displacing it forward toward the pubes. If anterior to the uterus, it is felt bimanually over the vesicovaginal septum. The uterus is, of course, displaced backward.

If small.
If large.
Lower than hematocele.

A *hematoma* of small size is at first doughy, and is situated beside the uterus ; if large, it feels elastic, fills the pelvis at one side and posteriorly, pushing the uterus toward the opposite inguinal canal, and is so intimately joined to it as to immobilize the cervix. The mass is lower in the pelvis and the uterus relatively higher than in hematocele.

In culdesac.
In front of rectum.
Around the rectum, etc.
Sacro-uterine folds.
Ring around rectum.

In hematocele, rectal indagation reveals an effusion in the broadened recto-uterine culdesac in front of and to the right of the rectum, while in hematoma it demonstrates the extension of the blood around the rectum down into the sacro-uterine ligaments, and against the lateral pelvic wall. In the former the sacro-uterine folds can often be felt under and against the effusion ; in the latter, the coagulated blood may form a ring around the rectum, behind the cervix.

Changes in tumor.

6. **Course and Termination.** Usually the tumor becomes perceptibly smaller and firmer after a few days. The surface is then felt to be somewhat uneven and hardened in

May remain large, etc.

places, owing to absorption of the serum and shrinking of the clot. Not infrequently, however, the hematocele becomes firmer, but remains large, elastic, and smooth almost indefinitely, owing to a want of coagulation and absorption of the fluid contents.

Infection. Abscess.

In many cases, particularly of hematoma, the mass becomes infected after a few weeks or months, and forms a large abscess that may remain for a long time as a source of irritation, or it may discharge into the rectum or vagina or elsewhere, the same as any pelvic abscess. (See part VII, chap. XII.)

Symptoms subside.

7. The **diagnosis** from *inflammatory exudates* is not difficult when we remember that the reaction and tenderness subside too rapidly for an inflammatory exudate of the same size, and leave but few or none of the symptoms of inflammation.

Onset. Abdominal tumor.

From *tumors* it is known by the symptoms attending its sudden appearance, and by its shrinkage or failure to grow. The rupture of an abdominal tumor is known by the previous abdominal enlargement, the lack of firmness of the extravasated mass, and the lower and more central position of the uterus.

Seldom fatal. Suppuration. Displacements, etc.

8. The **prognosis** is usually favorable as far as life and death are concerned. Suppuration may render the case serious, but the evacuation of the resulting abscess is generally easily accomplished. Displacements of the pelvic viscera, intestinal adhesions, fistulæ, and sterility are apt to be produced by the absorption of the clot or discharge of the pus, and may trouble the patient for some time.

Rest, ice-bag, etc. Prolonged rest in bed. Counter-irritation, salines, diet.

9. **Treatment.** At the first onset, rest in bed, an ice-bag over the pubes for twenty-four hours, cool drinks, and stimulants in case of syncope, are indicated; afterward, rest in bed for two or three weeks, counterirritation over the abdomen by the tincture of iodin applied twice daily, saline laxatives, and a light diet.

Puncture.

10. When suppuration ensues, the mass should be punctured per vaginam with an aspirating needle or small trocar, as far back and as near the median line as it can be reached, and guided by the finger rather than by sight. Pulsating vessels must be carefully avoided, and thorough antiseptic preparations be made. When the pus is reached, it should be evacuated as recommended for pelvic abscess (part VII, chap. XII, par. 13, 14, and 15).

Vessels. Antisepsis.

Treat as pelvic abscess.

Some pelvic hematoceles are not accessible from the vagina, and may either suppurate or cause continued invalidism by their presence. In such cases the abdomen is opened as for oophorectomy, and if upon exploration it is found to be an abscess that can be evacuated from the vagina, under guidance of the fingers in the abdomen (A. Martin), it should be so treated. If not, the sac can sometimes be stitched to the abdominal wound, and in two or three days, or after adhesion to the surface has taken place, it can be evacuated extraperitoneally.

When there is no suppuration, the mass can sometimes be partially or completely enucleated and the abdomen be closed immediately, or drained for twenty-four or thirty-six hours, according to the amount of oozing following. Or the blood may be evacuated, and the capsule be packed with gauze extending out through the abdominal incision.

If interference be deemed necessary during the first few days, it should be by abdominal section, in order that the parts may be secured against secondary hemorrhage. The whole mass should be removed and the ruptured vessels, if found, ligated. After two weeks or more have elapsed, and the mass is firm, evacuation per vaginam is probably safer, as there is no longer danger from hemorrhage, and it is desirable to avoid opening the peritoneal cavity.

INDEX.

Abdomen, examination of, 15
Abdominal incision, 55
    closure of, 56
  oophorectomy, technic of, 371
  pelvic hematocele, 588
  pregnancy, 568
  section, 49
    adhesions complicating, 74
    aftertreatment of, 72
    bandage after, 75
    baths after, 75
    for cysts of broad ligament, 554
    for extra-uterine pregnancy, 578
    for ileus, 74
    for oophoritis, 390
    for ovarian tumor, 549
    for pelvic abscess, 382
    for prolapse, 269
    for prolapsed ovary, 279
    for salpingitis, 369
    ileus after, 74
    in a pregnant uterine horn, 584
    nourishment after. 74
    rest in bed after, 75
    secondary, 74
    sitting up after, 75
    temperature after, 74
  suspension of uterus, 251
Abscess, ovarian, 355
  pelvic, 374
  tubo-ovarian, 353
Adenocarcinoma (see Carcinoma)
Adhesions complicating abdominal section, 74
  separation of, 243
Aftertreatment of abdominal section, 72
  of minor operations, 71
Alexander's operation, 249
    in displacement of the ovary, 277
    Newman's method, 250
Amenorrhea, 151
  inflammatory, 161
  mechanical, 163
  membranous, 165
  primary, 152
  secondary, 153
Amputation of cervix uteri for prolapse, 267
  of the cervix for carcinoma, 462
Anaphrodisia, 169
Anatomy, 77
Angioma of the uterus, 561
Anomalies of development, 119
Anteflexion of the uterus. 228
    pathological, 229
    permanent, 229
    pessaries in, 234
    puerile, 230, 232
    with torsion, 230
Anteversion, 234
Antisepsis, 36
Anus, dilation of, 32
Apparatus for operating, 45
Appendicitis and salpingitis, 362
Applicator, uterine, 30
Arrangements for operating, 46
Asepsis of dressings, 39
  of instruments, 39
  of sutures, 40
  of the skin, 36
  personal, 37
Aspiration in salpingitis, 368
Atresia and stenosis of the genital canal, 136
  of the Fallopian tubes. 138
Atrophy of Fallopian tube, 356
  of ovary,
  of uterus, 129

Bimanual examination, 24
Bladder, anatomy of, 103
  douche, 51
  gangrene of, 298
  in prolapse, 255

Bladder, inflammation of, 298
ulceration of, 300
wounding of, during operation, 74
Braun's, uterine syringe, 30

Calibrator, urethral, 33
Carcinoma, 443
abdominal, total hysterectomy for, 468
amputation of cervix for, 462
and cervical metritis, 315
complicated by pregnancy, 469
microbes found in, 456
of cervix uteri, 447
of chorion, 476, 477
of corpus uteri, 470
of Fallopian tube, 479
of ovary, 482
of vagina, 445
of vulva, 443
syncytiale, 476, 477
vaginal hysterectomy for, 465
Case taking, 13
Catheter, care of, 51
introduction of, 51
return, 35
Catheterization after minor operations, 71
of ureters, 52
Celiotomy (see Abdominal Section)
Cellulitis, germs of, 373
pelvic, 372
and salpingitis, 362
varieties of, 372
Cervical metritis, 308
and carcinoma, 315
and sarcoma, 315
Cervix, laceration of the, 215
uteri, ulceration with procidentia of, 255
cystic degeneration of, 310
elongation of, 256, 259, 267
erosion of, 309, 310
inflammation of, 308
local treatment of, 316
polypi in, 310
prolapse of, 254
Chancroid, 415
Chlorosis, 146
Clitoris, anatomy of, 78
Closure of abdominal incision, 56
Colpeurynter, Braun's, 261
Colpocele, 254
diagnosis of, 259
Colpocele, treatment of, 265
Colpotomy, anterior, 370
posterior, 371
Condyloma (see Papilloma)
Connective tissue, pelvic, 110
Contusions of the vulva, 186
Counterirritation, 63
Curettage for carcinoma of uterus, 479
technic of, 327
Curette, uterine, 33
Cystic tumors, 526
of glands of labia, 526
of the ovary, 529
dermoid, 538
development, 539
fluid of, 532
infection of, 541
papillary, 534
proliferating, 540
removal of, 548
rupture of, 541
simple, 529
tapping, 548
twisting of pedicle in, 541
of the uterine walls, 527
of the vagina, 527
Cystitis, 298
spurious, 298, 301
Cystocele, 254
diagnosis of, 259
treatment of, 265
Cystoscope, 49
Cysts of the broad ligament, 552
enucleation of, 554
of the uterine walls, 527
of the vagina, 526

Deciduoma malignum, 476, 477
Development and anomalies of, 113
Diagnosis, 13
Dilation of anus, 32
of cervix, gradual, 66
of cervix, rapid, 66
of cervix uteri, 65
of internal pelvic veins, 560
of urethra, 32
of uterus, 31
of uterus, Vulliet's method, 61
Dilator, urethral, 32
uterine, 31
Disinfection, intestinal, 43
of dressings, 39
of instruments, 39

- Disinfection of patients, 41
  - of room, 46
  - of sutures, 40
  - of the alimentary canal, 42
  - of the field of operation, 42
  - of the skin, 36
- Disorders of the sexual relation, 169
- Displacement of bladder, 254
  - of ovary, 276
  - of rectum, 254
  - of the urethra, 254
- Displacements of uterus, 224
    - classification of, 228
    - congenital, 129
- Douche, bladder, 51
  - vaginal, antiseptic, 43
    - for hemorrhage, 157
    - hot, 62
    - medicated, 291
- Drainage-tubes, 41
  - abdominal, 50
  - in salpingitis, 368, 369
  - Mikulicz, 50
  - vaginal, 50
- Dressings, 45
- Dysmenorrhea, 159
  - inflammatory or congestive, 161
  - mechanical, 163
  - membranous, 164
  - neuralgic, 159
  - with anteflexion, 231
- Dyspareunia, 171

- **Ectopic** pregnancy (see Extra-uterine Pregnancy), 563
- Electricity for myoma uteri, 514
  - in extra-uterine pregnancy, 578
  - kinds of, 64
- Elongation of cervix, 256
    - amputation for, 267
    - diagnosis of, 259
    - pessary in, 262
    - treatment of, 261
- Emmet's button-hole operation, 297
- Endometritis (see Metritis and Hyperplasia)
- Endothelioma, 495
  - benign, 388
  - of cervix uteri, 497
  - of ovary, 499
  - of uterus, 498
  - of vagina, 496
- Enemata after abdominal section, 73
- Enterocele, anterior, 254
- Enterocele, anterior, diagnosis of, 260
    - treatment of, 267
  - posterior, 255
    - diagnosis of, 260
    - treatment of, 267
- Enucleation of the cervix uteri, 268
- Epispadias, 135
- Erosion of cervix, 309, 310
- Examination, bimanual, 24
  - digital, 21
  - in Sims' posture, 25
  - instrumental, 25
  - manual, 21
  - ocular, 20
  - of abdomen, 15
  - of cervix uteri, 22
  - of corpus uteri, 22
  - of ovaries, 23
  - of pelvis, 17
  - of rectum, 23
  - of tubes, 23
  - of ureters, 52
  - of vagina, 21
  - preliminaries, 17
  - preparation for, 17
  - under anesthesia, 35
- Exercise and rest, 64
- Exploratory puncture, 54
    - for ovarian tumors, 547
  - abdominal incision, 55
  - vaginal incision, 56
- External genitals, development of, 117
- Extra-uterine pregnancy, 563
    - abortion in, 564
    - apoplectic ovum in, 566
    - drainage for, 581
    - electricity in, 578
    - morphin injections in, 578
    - mummified fetus in, 582
    - peritoneal section in, 579
    - rupture of, 565
    - size of sac in, 577
    - spurious labor in, 572
    - suppuration in, 582
    - uterus in, 571
    - varieties of, 563, 564

- **Fallopian tubes**, anatomy of, 96
    - atrophy of, 356
    - development of, 115
    - inflammation of, 344
    - malformation of, 120
- Fetal uterus, 126
- Fibroma, fibromyoma (see Myoma), 501

Fibroma of the ovary, 523
Fistula, enterovaginal, 213
  fecal, 211
  rectal, 211
  repair of urinary, 204
  ureteral, 209
  urinary, 202
Forceps, bladder, 33
  dressing, 30
  vulsellum, 30
Fossa navicularis, 79
Fumigation, 46

Genital cord, 115
  organs at birth, 118
  tuberculosis (see Tuberculosis)
Girlhood, hygiene of, 68
Gonococcus, cultures of, 400
Gonorrheal cellulitis, 400
  cervicitis, 396
  cultures, 406
  endometritis, 396
  infection, 391, 401
  inflammation, 391
  ovaritis, 400
  peritonitis, 400
  proctitis, 401
  salpingitis, 397
  sterility in, 408
  urethritis, 394
  vaginitis, 395
  vulvitis, 393
  vulvovaginal ducts, 394
Guide, ureteral, 35
Gymnastics, pelvic, 67
Gynecological technic, 36

Hematocele and hematoma (see Pelvic Hematocele), 584
Hematoma of the vulva, 186
  pelvic, 584
Hematometra, 138
Hematosalpinx, 353
  due to atresia, 138
  spurious, 353
Hermaphrodism, female, 135
Hernia of the ovary, 277
Herniotomy, 279
Hook, uterine, 30
Hydrocele of labium majus, 526
Hydrometra, 139
Hydrosalpinx, 351
  and cyst of broad ligament, 363
Hydrosalpinx and hematoma, 363
  and parovarian cyst, 363
  and tubal pregnancy, 363
Hygiene of girlhood, 68
Hymen, anatomy of, 81
  deformities of, 133
Hyperesthesia, 172
Hyperplasia of uterus, 319
Hypertrophy of cervix uteri, 256
  of uterus,
Hypospadias, 135
Hysterectomy, abdominal, total, 468
  by Kraske's method, 479
  for carcinoma of cervix, 465
    of uterus, 479
  for diseased appendages, 371
  vaginal, 465
    bloodless, 270
Hysteria, 176
Hystero-epilepsy, 177
Hysteropexy, 251
Hysterorrhaphy, 251

Ileus after abdominal section, 74
Infantile uterus, 127
    and retroversion, 238
Inflammation of vulvo-vaginal gland, 282
Intestines, wounding of, during operation, 74
Inversion of uterus, 227, 270
    gradual method of reduction of, 224
    mechanism of, 270
    reduction of, by taxis, 273
    with fibroid polypus, 272, 273
    with prolapse, 272

Kraurosis of vulva, 285

Labia majora, anatomy of, 78
  minora, anatomy of, 78
Laceration and retroversion, 239
  of the cervix, 215
    operation for, 216
    preparatory treatment of, 219
  of the perineum, 187
Laparotomy (see Abdominal Section)
Lapsus uteri, 254, 267
Laxatives, 69
  after abdominal section, 73

Lipoma, 556
  of broad ligament, 556
  of vulva, 556
Local treatment in oophoritis, 390
    in salpingitis, 367
    of cervix, 316–318
    of uterus, 341–344

Malignant adenoma of uterus, 472
Massage, 65
  abdominal, 65
  for chronic cellulitis, 378
  for prolapse of genital organs, 262
      of rectum, 264
  for retroversion, 242
  pelvic, 66
Medicines used in amenorrhea, 153, 155
    in anaphrodisia, 171
    in chlorosis, 147
    in cystitis, 301, 302
    in dysmenorrhea, 160, 165, 167
    in gynecology, 69
    in hysteria, 179
    in menorrhagia, 158
    in neurasthenia, 182
    in preparing for operations, 68
    in pruritus, 175
    in retroversion, 243
    in salpingitis, 366
    in syphilis, 414
    in tuberculosis of bladder, 441
    in tuberculosis of peritoneum, 434, 435
    in uterine myoma, 515
Menopause, 148
Menorrhagia, 154
  in hyperplasia, 325
  in myoma, 491
  in sarcoma, 508
Menstruation, 149
  conduct during, 68
  history of, 13
  in hyperplasia, 325
  in metritis, 338
  suppression of, 154
  varieties of disordered, 150
  vicarious, 150
Metritis, acute, 303
  chronic cervical, 308
  chronic corporeal, 308
  varieties of, 331
Metrorrhagia, 155
Mikulicz drain, 50
Minor operations, aftertreatment of, 71
Morphin injections in extra-uterine pregnancy, 579
Mueller's ducts, 113
Myoma of broad ligament, 525
    Fallopian tube, 523
    ovarian ligament, 525
    round ligament, 524
    uterus, 502
      during pregnancy, 522
      induction of menopause for, 516
      ligation of arteries for, 516
      medicines in, 515
      removal of, 517
      variation from normal, 505
      varieties of, 503
    vaginal walls, 502
    vulva, 501

Neurasthenia, 180
Nurses at operation, 46
Nymphomania, 170

Oophorectomy, abdominal, 371
  vaginal, 369
Oophoritis, 385
  and endometritis, 387
  varieties of, 385
  with salpingitis, 354
Operating table, 47
Operations (see Gynecological Technic)
  aftertreatment of, 71
  beginning, 49
  finishing, 49
  for prolapse of ovary, 277
  on the vagina, 50
Ovarian cystoma (see Cystic Tumors of the Ovary)
  pregnancy, 568
Ovariotomy, 548
  abdominal, 549
  complications of, 551
  vaginal, 551
Ovary, abscess of, 355
  anatomy of, 99
  anomalies of development of, 119
  atrophy of, 386
  development of, 114
  displacements of, 276

Ovary, endothelioma of, 388
    gyroma of, 387
    hematoma of, 382
    hernia of, 277
    hyperemia of, 382
    inflammation of (see Oophoritis), 354, 385

Papilloma, 557
    of Fallopian tubes, 557
    of ovary, 557
    of vulva and vagina, 557
Parametritis, 375
    posterior,
    with anteflexion, 229, 233
Parovarian cysts, 552
Parovarium, anatomy of, 101
Pelvic abscess, 374
        evacuation of, 379
        following hematoma, 588
        peritoneal section for, 382
    cellulitis, 372
        and salpingitis, 362
        varieties of, 372
    connective tissue, anatomy of, 110
    floor and perineum, 82
    hematocele and hematoma, 584
        suppuration in, 588
Perineorrhaphy, aftertreatment of, 192, 194, 200
    Emmet's, 192, 201
    for complete laceration, 198
    Freund s, 202
    Hegar's, 202
    immediate, 190
    secondary, 192
    Tait's, 195
Perineum and pelvic floor, 82
    laceration of, 187
Peritoneum, anatomy of, 110
Peritonitis, general, 360
    pelvic, 344
Perverted sexual excitability, 171
Pessaries, cleansing of, 247
    douches after use of, 247
    in elongation of cervix, 262
    in prolapse, 261
    in retroversion, 247
    introduction of, 248
Polypus in cervix, 310
Postures, 18
Pozzi's operation for ureteral fistula, 211
Preparation for operation, 36
Preparation of room (see Disinfection), 46
Procidentia uteri, 253
        diagnosis of, 260
        operations for, 269
        treatment of, 266
Prolapse of cervix uteri, 254
            diagnosis of, 259
            pessary in, 262
            treatment of, 261
    of rectum, massage in, 264
    of uterus, 227, 253
        congenital, 257
        massage in, 262
        mechanism of, 253
        operation for, 265–270
        pessaries in, 261
Pruritus vulvæ, 174
Puberty, 148
Puerile cervix uteri, 128
    uterus, 127
Pyometra, 139
Pyosalpinx, 349
    and ovarian cystoma, 363
    and uterine fibroid, 363

Rectocele, 254
    diagnosis of, 259
    treatment of, 266
Rectum, anatomy of, 108
Rest and exercise, 64
    in bed after abdominal section, 75
                vaginal section, 76
        urinating after, 76
Rest-cure, 182
Retroflexion (see Retroversion)
Retroposition of the uterus, 231, 232
Retroversion, 236
    congenital, 237
    mechanism of, 228
    operations in, 249
    pessaries in, 247
    replacement in, 244
    separation of adhesions in, 243
Rudimentary horn, pregnancy in, 582

Salpingitis, 344
    and appendicitis, 362
    and cellulitis, 362
    catarrhal, 344
    classification of, 344
    in young girls, 362
    interstitial, 347
    purulent, 346

Sarcoma, 485
  of cervix, papillary, 487
  of Fallopian tubes, 494
  of ovaries, 494
  of uterine walls, 492
  of uterus, 487
  of vagina, 485
  of vulva. 485
Scarificator, cervical, 33
Sedatives, nervous, 70
Sexual relation, disorders of, 169
Shock after abdominal section, 72
Shortening of round ligaments, 249, 252
  of sacro-uterine ligaments, 252
Simon's retractors, 29
Sims' depressor, 26
  posture, 18
  speculum, 26
Sitting up after abdominal section, 75
Sitzbath, 62
Skene's urethral glands, 102
Sound, block-tin, 31
  spiral ureteral, 35
  uterine, 25
Speculum, bivalve, 27
  Nelson's, 29
  Nott's, 29
  Sims', 26
  trivalve, 28
  vaginal. 26
Spurious cystitis, 298, 301
  hematosalpinx, 353
Steam cautery, 329
Stenosis of genital canal (see Atresia), 137
Sterility, 167
  with anteflexion, 231
  with hyperplasia uteri, 326
  with retroversion, 239
Sterilizers, 39
Subinvolution, hyperplastic, 323
  inflammatory, 336
  menstrual, 319
Subperitoneal cysts, 552
Sucker, 33
Sutures, preparation of, 40
  removal of, 51
Syphilis, 412
  gummata of, 413
  initial lesion of, 412
  mucous patches of, 412
  tubercles of, 413
Syringe, aspirating, 33, 171
  uterine, 30

Table, operating, 47
Tamponade, vaginal, 58
Tampons, how to make, 317
Tapping, 54
Technic, gynecological, 36
Temperature after abdominal section. 74
Torsion of uterus, 227
    with anteflexion, 230
Trachelorrhaphy, aftertreatment of, 221
  Emmet's, 219
  preparatory treatment of, 219
  Schroeder's, 222
Treatment of shock, 72
Trocar, 54
Tubal abortion, 564
  mole, 566
  pregnancy (see Extra-uterine Pregnancy), 563
  rupture, 565
Tuberculosis, 419
  of bladder, 439
  of cervix uteri, 420
  of corpus uteri, 421
  of Fallopian tube, 426
  of ovary, 426
  of peritoneum, 431
    caseous, 435
    fibrous, 434
    miliary, 431
  of vagina, 419
  of vulva, 418
Tubes. uterine irrigating, 35
Tubo-ovarian abscess, 353
  cyst, 353

Ureteral instruments, 33, 49, 53
Ureters. anatomy of, 105
  catheterization of, 52
Urethra, anatomy of, 102
  in prolapse, 255
  inflammation of, 292
  sacculated, 294. 297
Urethral caruncle, 560
Urethritis, 292
Urethrocele, 254
  diagnosis of, 259
  treatment of, 265
Urinalysis before operation, 44
Urinary fistula (see Fistula), 202
Urination after minor operations, 71
Uterine hemorrhage, hemostasis. 59
Uterus, absence of, 121
  anatomy of, 86

Uterus, anteflexion of, 228
  arrested development of, 126
  atrophy of, 129
  congenital displacements, 129
  development of, 117
  displacements of, 224
  flexions of, 226
  hyperinvolution of, 129
  hypertrophy of, 129
  inversion of, 227, 270
  lapsus of, 254
  malformations of, 120, 121
  normal position of, 224
  normal supports of, 225
  procidentia of, 253
  prolapse of, 227, 253
  simple displacements of, 225
  torsion of, 227
  versions of, 226

Vagina, absence of, 132
  anatomy of, 80
  development of, 116
  inflammation of, 288
  malformations of, 120, 132
  prolapse of, 253
Vaginal douche, antiseptic, 43
    for hemorrhage, 157
    hot, 62
    medicated, 291
  fixation of uterus, 250, 269
  hysterectomy for carcinoma, 465
    for ovarian tumors, 552
  incision, 56
    in extra-uterine pregnancy, 579
Vaginal oophorectomy, technic of, 369
  section, 76
    douches after, 76
    for ovarian cystoma, 551
    for prolapse, 270
    in extra-uterine pregnancy, 578
    rest in bed after, 76
    shock after, 76
  walls, 80
Vaginismus, 173
  operation for, 174
Vaginitis, 288
Varicose veins of the vulva, 558
Vascular spots of vulva, etc., 560
Versions of uterus, 226
Vestibule, anatomy of, 78
Vulliet's method of dilatation, 61
Vulva, absence of, 134
  anatomy of, 77
  anomalies of development of, 134
  development of, 116
  elephantiasis of, 287
  inflammation of, 280
  noma, or gangrene of, 286
Vulvitis, follicular, 281
  phlegmonous, 282
  simple, 280
Vulvovaginal duct, occlusion of, 283
  glands, anatomy of, 79
    inflammation of, 282
    occlusion of, 283
    suppuration of, 284

Wathen's dilator, 32
Weir Mitchell rest-cure, 182
Wolffian body, 113

Date Due

Demco 293-5			

RG101
897By

Accession no.
2097
Author
Byford, H.T.
Manual of gynecolog
2d ed.
Call no.

~~19th CENT.~~